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Our Tests Reveal Surprising Winners

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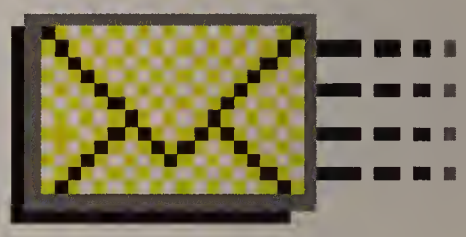
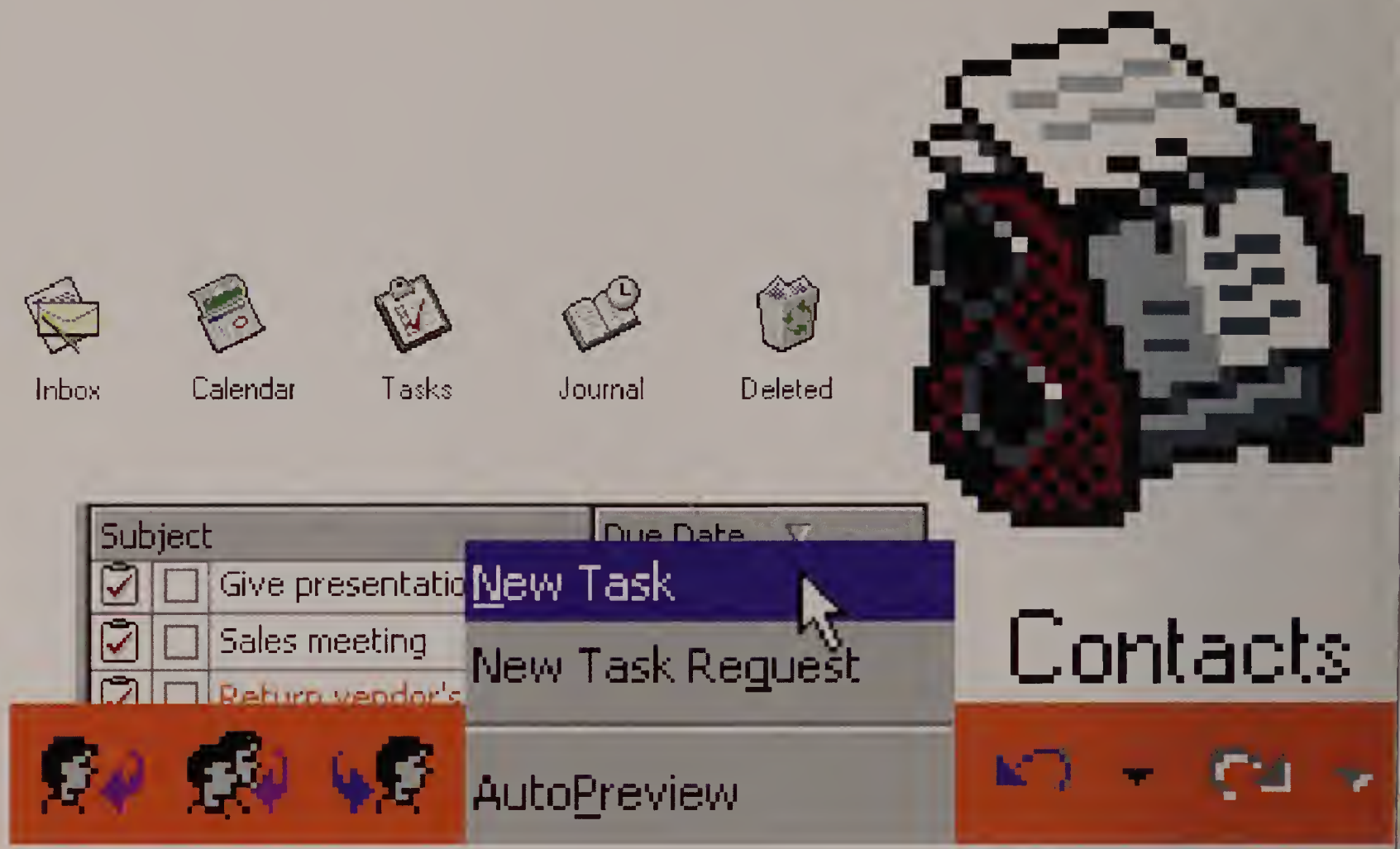


Microsoft Office 97/now/

Subject	Received
FW: Home Essentials	Fri 3/7/97

RE: Hey there!

Hey guys: I realize you're all looking forward to doing a major presentation at 8:00 A.M., but as it happens, the meeting time has been pushed back to 3:00. So sleep in an extra 17



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to stay disorganized.

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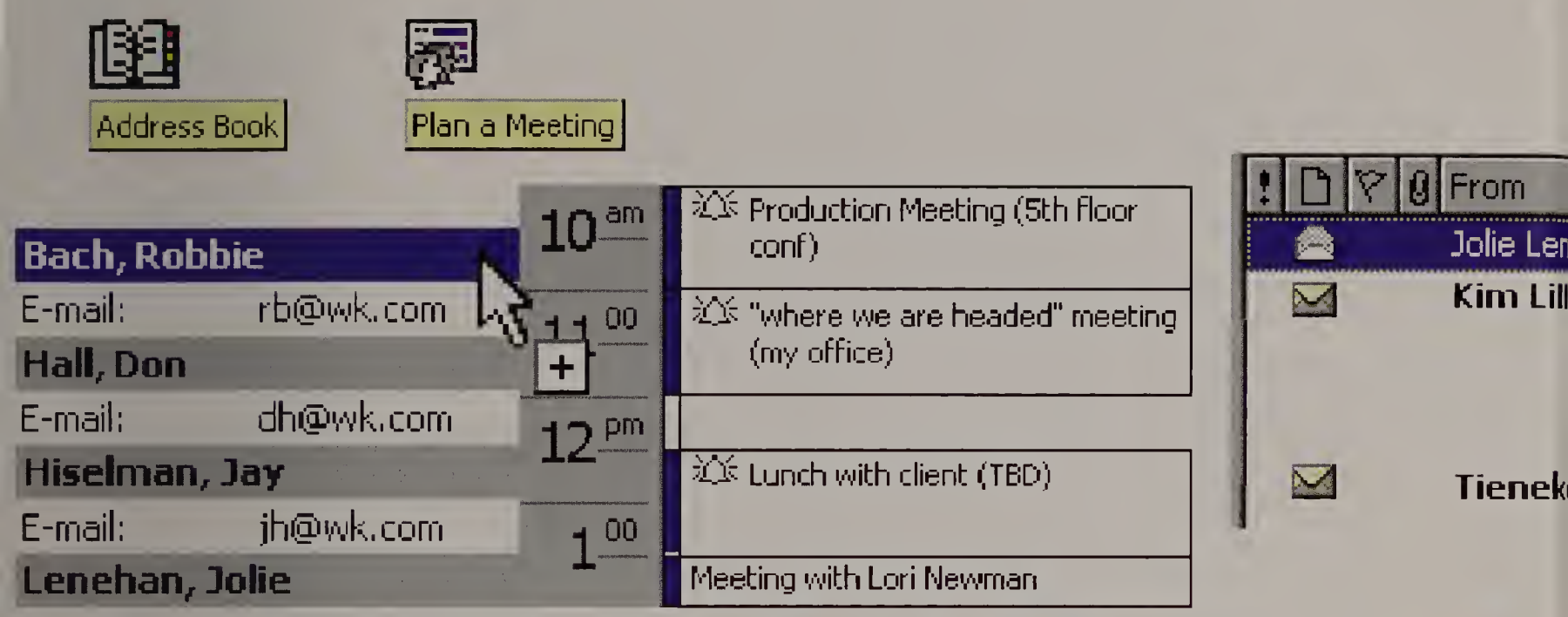

lly, really hard

Some people are inclined to neatly arrange, file, cross-reference and deploy strategic bits of information, like what's-his-name, the guy who sent you the e-mail about the thing on Tuesday... or Wednesday. Well, here's good news for the highly with-it and the chronically disorganized alike: the new Microsoft® Outlook™ 97 desktop information manager. It's part of new Microsoft Office 97, and it's here to help you get organized (or, as the case may be, way more organized). Outlook puts your e-mail, electronic scheduling, "to-do" lists and contacts in one cozy interface. It helps you do smart things, like preview the first three lines of your e-mails to quickly separate news from junk. And you can easily share, link and move information; for instance, drag an e-mail onto the contacts icon and a new contact file is automatically created for you. Now, that's functionality. Want to know more? Block out a little time to visit our Web site.

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the television

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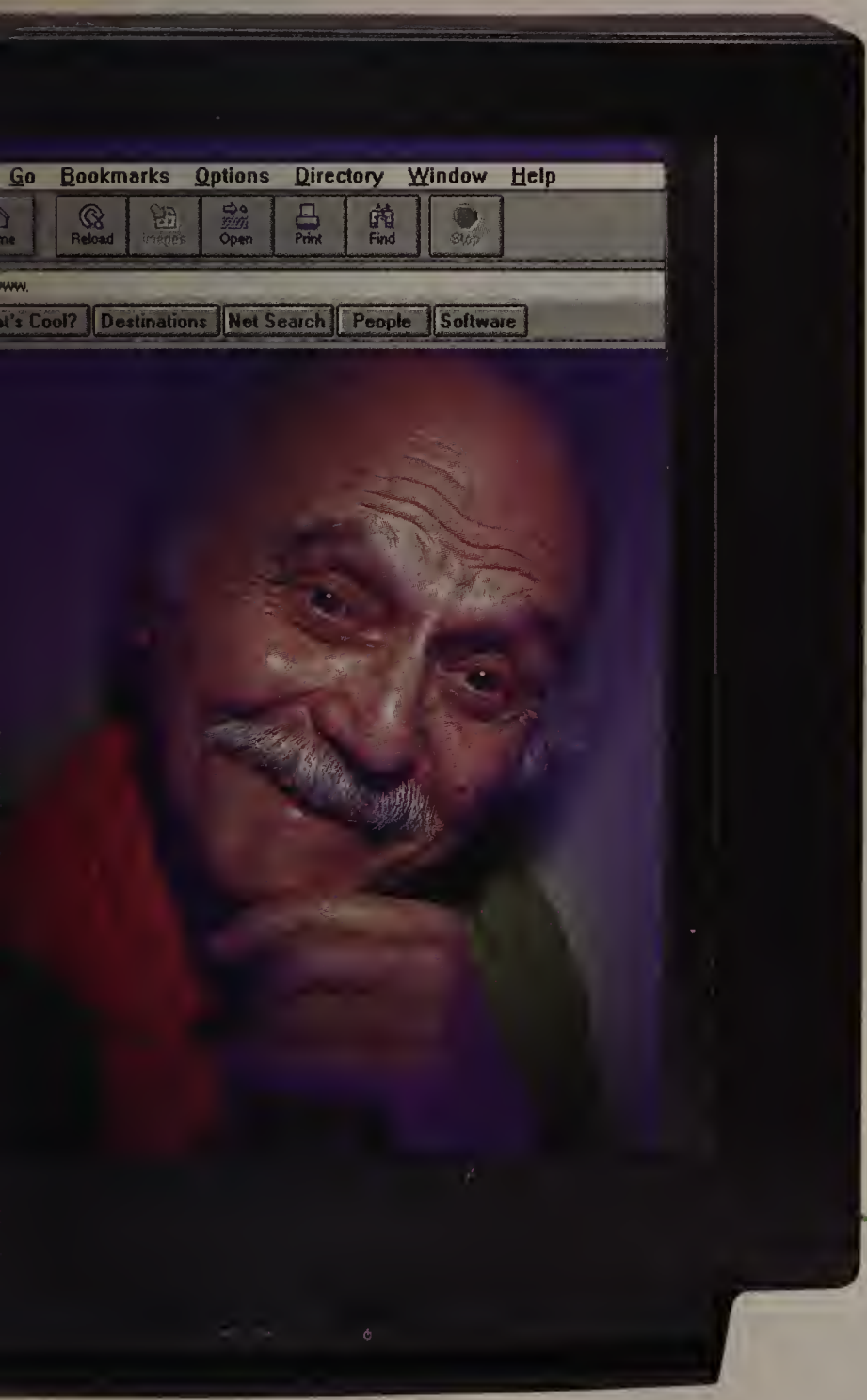

the monitor

Early computer "displays" were simple text displays or printed output. Used with mainframes, the first true monitors were rack-mounted behemoths. In the early 1980's microcomputers displayed alphanumerics and jagged graphics in monochrome. Today, monitor technology has advanced to exquisite high-resolution color and full-motion video.

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JULY

VOLUME 15 ◆ NUMBER 7

COVER STORY

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WORLD CLASS In a year rocked by new PC processors and the unprecedented growth of the Web, our 1997 World Class Awards spotlight products in 84 categories. From business and home PCs to Internet service providers, here's the ultimate guide to the best products, companies, and services of the year.

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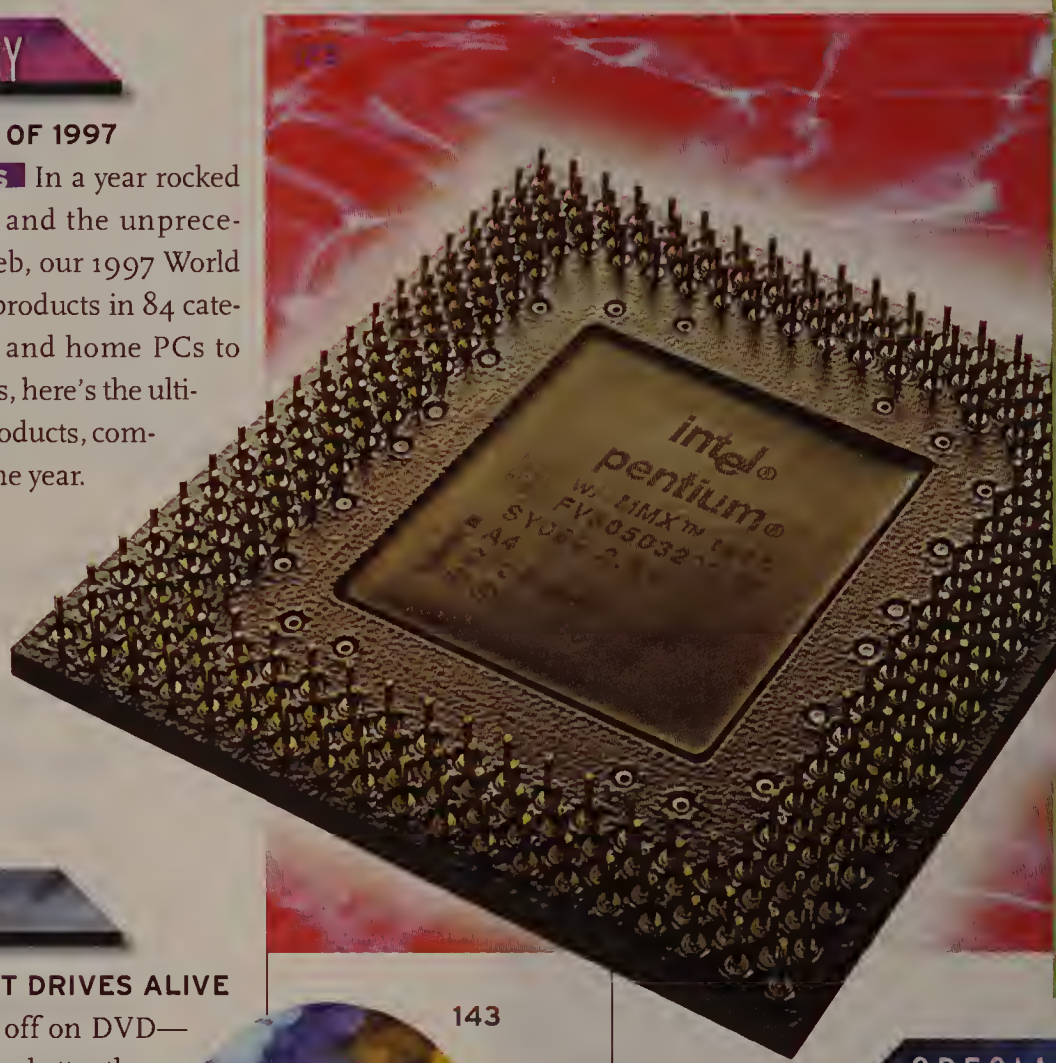

FEATURES

143 **12X, 16X, 18X: FASTEST DRIVES ALIVE**

REVIEW Hold off on DVD—CD-ROM drives are better than ever. We tested 12 of the fastest and found two Best Buys: Teac's $149 no-frills 12X workhorse and Plextor's $269 ultrafast thoroughbred.

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158 **FIND A GREAT PC DEAL ON THE WEB**

CONSUMER ISSUES It's open 24 hours, makes bargain shopping easy, and has no pushy salespeople bothering you. But will you spend your PC dollars online without a handshake or a human voice? Here's our advice.

173 **33.6 AND GETTING FASTER**

REVIEW 56-kbps is getting all the buzz—but your best bet may still be a 33.6-kbps modem. Our top picks: U.S. Robotics' feature-rich Courier V.Everything and Zoom's all-purpose FaxModem V.34I Plus.

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Additional material available on PC World Online: www.pcworld.com

SPECIAL REPORT

SMALL OFFICE, HOME OFFICE

189 **YOU *CAN* MAKE MONEY ON THE WEB**

More small companies are feeling pressured to get online. But what does it take to make a profit on the Web? From an employment headhunting firm to a rental and relocation clearinghouse, we talked to four companies making money on the Web and found out how they did it.

199 **HOT PICKS FOR THE HOME OFFICE**

Free Internet e-mail from any PC, HP's color printer/fax/scanner/copier, a business plan CD-ROM guide, a handheld label printer, and more.

COVER *Digital Photographs by Ken Smith*

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58 AFFORDABLE COMPUTERS NEVER LOOKED BETTER
Not quite ready to shell out $3500 for a flashy 266-MHz Pentium II? Relax. As vendors release new 233-MHz Pentium MMX and Pentium II systems, your choices have just gotten better. The bottom line: Pentium MMX-233 PCs are almost as fast as Pentium II-233s but usually cost less.

64 AIRBORNE OFFICE: MODEMS, POWER CONNECTIONS FALL SHORT OF CLAIMS
Despite advances like in-flight electrical service, tight spaces and slow, unreliable connections will keep your office earthbound.

66 WIN 97 SOFTWARE SUITES: NO FIX FOR SPEED FREAKS
With performance improving little or not at all, slick new features may be the only reason to upgrade to Microsoft Office 97 and Lotus SmartSuite 97.

76 FREE E-MAIL: A VIABLE OPTION
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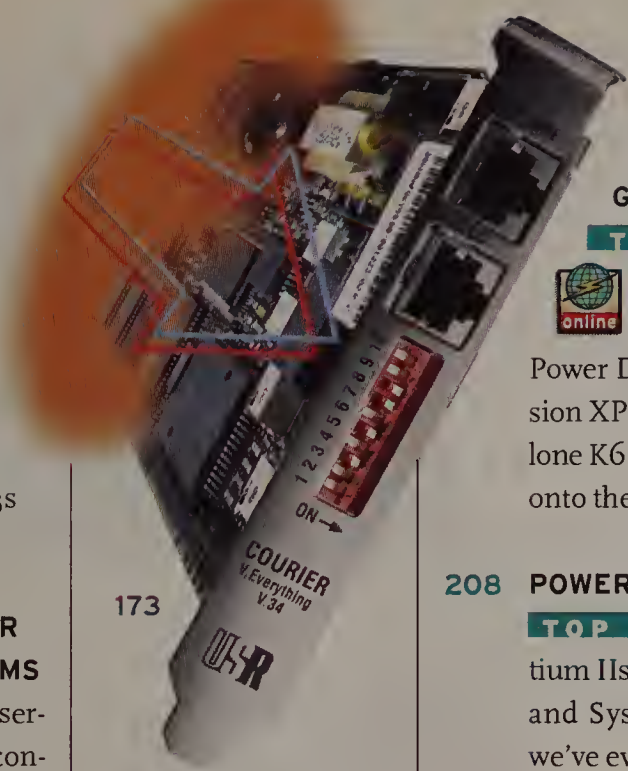

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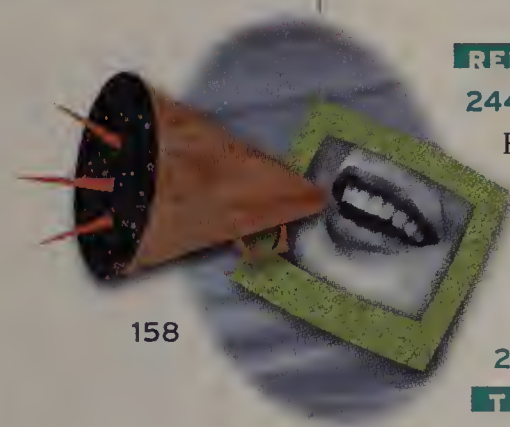

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TOP 100

205 PENTIUM II AND K6: GOLIATH VS. GOLIATH
TOP 100 The new giants in PC processing power have hit our Top 20s. Four new P-IIs made the Power Desktops chart, with the Dell Dimension XPS H266 taking the top position. The lone K6, Polywell's Poly K6200Mx, squeaked onto the Top 20 with a $2569 bargain price.

208 POWER DESKTOPS
TOP 20 Big debuts this month: Pentium IIs from Dell, Gateway 2000, Quantex, and Sys Technology, plus the first K6 PC we've ever tested, Polywell's Poly K6200Mx.

224 BUDGET DESKTOPS
TOP 20 Budget PCs and MMX power are no longer mutually exclusive as MMX PCs break onto the chart, including the number one Dell Dimension XPS M166s.

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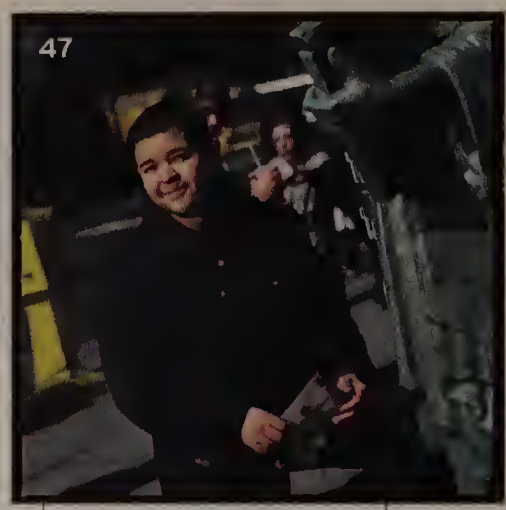
Dell and HP continue to dominate, but IBM's Aptiva C8E is speedy, affordable, and loaded.

268 HOME OFFICE
Steve Bass finds a hot CPU he doesn't want.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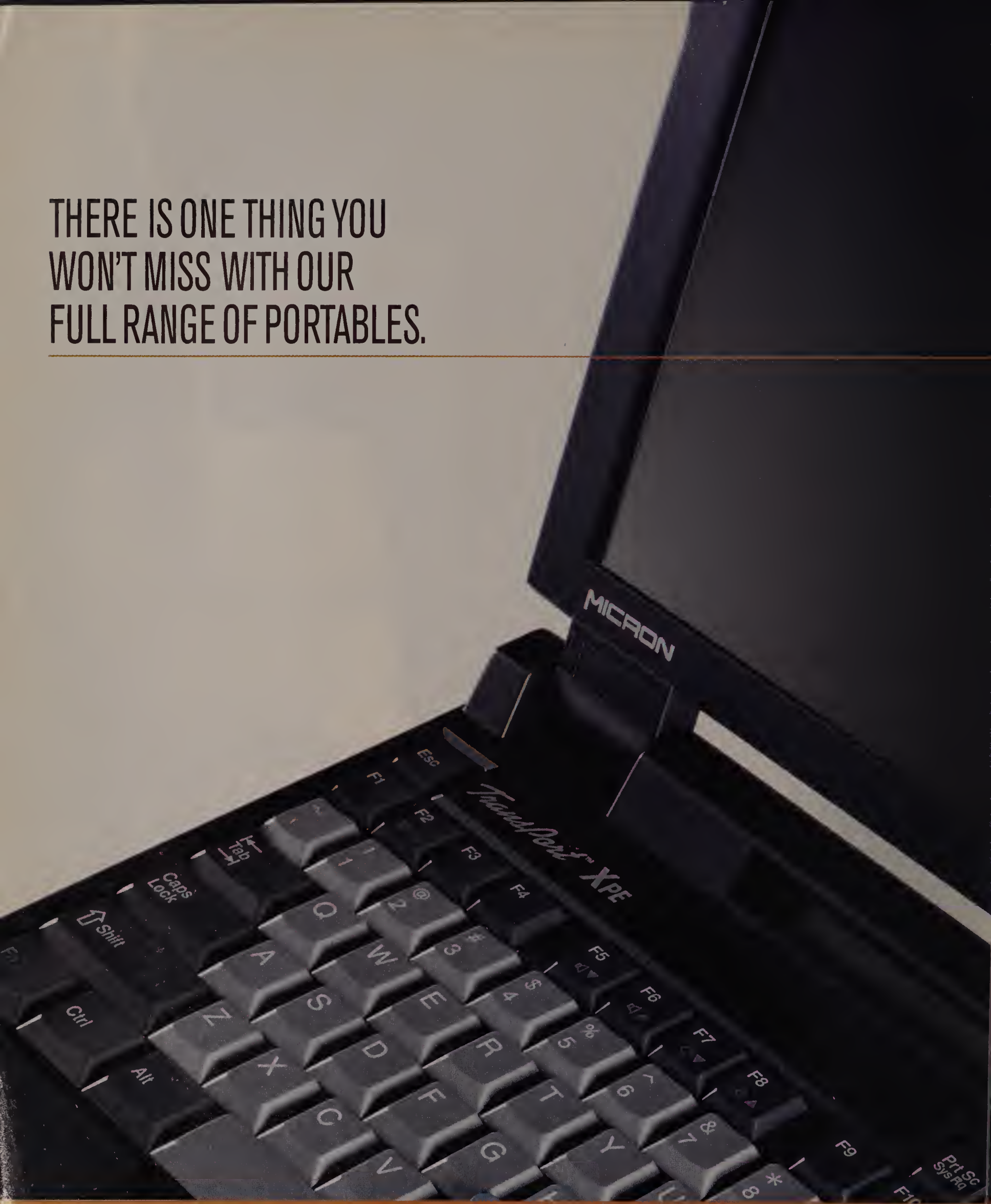

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*PC World, best overall PC company for reliability and service, December, 1996.

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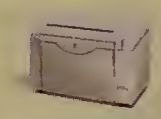
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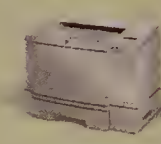
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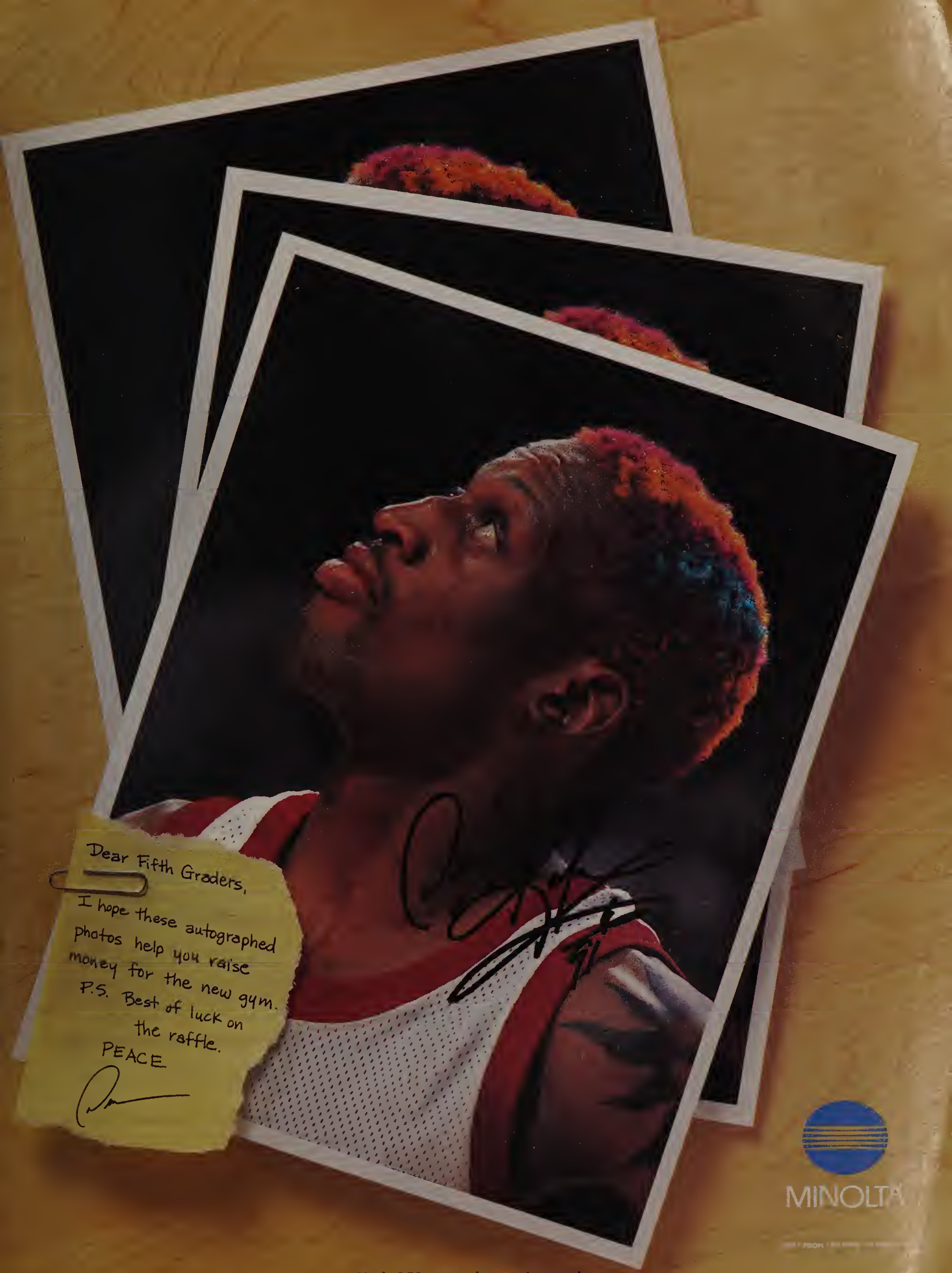

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World Class Awards ...and Headaches

PC WORLD'S 15TH ANNUAL World Class awards honors outstanding products in 84 categories, including two Most Promising Newcomers: Intel's Pentium MMX and Microsoft Office 97. Runner-up for Most Promising Newcomer in the hardware category is U.S. Robotics' x2 56-kbps modem technology. Bravo to 56-kbps technology! And phooey to the most bungled product rollout in years!

Since judges for this year's awards cast their votes in late winter, not much has gone right with 56-kbps technology—not only from a technology standpoint, but more important, from the viewpoint of prospective buyers coping with confusion and "corrected" expectations.

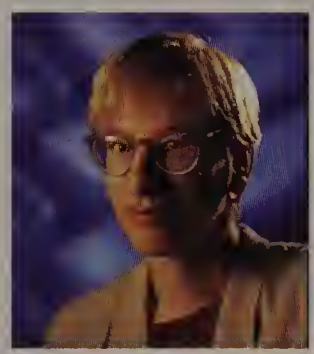
What went wrong? Almost everything. And until problems are straightened out, buyers are left holding the bag. Here's a recap to date:

◆ *Well before 56-kbps modems and services were actually available, advance advertising for the two incompatible technologies—U.S Robotics' x2 and Lucent/Rockwell's K56flex—promised speeds up to twice as fast as "most" modems.*

In fact, as almost everyone knows by now (and as the ads eventually acknowledged), both x2 and K56flex modems work at high speeds only when downloading data from an Internet service provider equipped with a compatible server modem. Otherwise, 56-kbps modems run only as fast as 33.6-kbps modems. What's worse, not everyone will be able to achieve speeds close to 56 kbps because of poor-quality phone lines. And in some cases, x2 and K56flex modems won't operate above 33.6 kbps at all because of limitations in the telephone infrastructure. A telling legal note: In April, a California attorney filed class-action lawsuits against x2 and K56flex modem makers, alleging false advertising.

◆ *In early spring, each technology's camp trumpeted widespread adoption of its standard by PC makers, modem makers, and ISPs.*

In fact, the availability of products and services for both technologies is still all over the map. Initially, modems were slow to ship because of technical problems. Rockwell, for example, halted shipment of its K56flex chip sets, causing Motorola, among others, to stop shipping its 56-kbps modems less than two weeks after it released them.



What **went wrong** with **56-kbps** technology? Almost **everything.** And **buyers** are left **holding the bag.**

Even now, it's nearly impossible to figure out who's actually selling 56-kbps modems and which ISPs actually provide 56-kbps service in which parts of the country. If you're in the market for a new PC, consider this scenario: You want to buy a Quantex Pentium-MMX PC, which includes a K56flex modem. You subscribe to AOL, which is currently testing x2, though not yet in your city. But you're about to cancel your AOL account and are thinking of switching to Mindspring, which is now selectively testing x2, or to Earthlink, which resides in the K56flex camp. Trouble is, neither ISP can say for sure when it will offer 56-kbps service in your area. Moreover, you don't have the slightest idea if any 56-kbps modem will work at high speeds over your phone lines, though you know your 33.6-kbps connections usually fall back to far slower rates. I'd pass, thank you.

The fight over incompatible technologies will not be resolved until sometime next year, when the International Telecommunication Union recommends a standard.

◆ *To encourage purchases and allay fears about incompatibility, vendors are promising free or inexpensive upgrades to new 56-kbps modems and to the yet-to-be-determined ITU standard.*

In fact, many buyers will end up paying $40 to $150 to upgrade 33.6-kbps modems to 56 kbps. Some buyers will have to send in their 33.6-kbps modem, and others are promised a downloadable software upgrade.

Again, problems are surfacing. U.S. Robotics promised a free 56-kbps upgrade to buyers of its 33.6-kbps Sportster modems last winter. But many who took U.S. Robotics up on its offer are getting nothing but jammed phone lines and aggravation due to the byzantine upgrade process and confusion over eligibility.

That's the obstacle course customers face just to upgrade from one manufacturer's 33.6-kbps model to its 56-kbps unit. Imagine the mess next year when massive numbers of buyers try to upgrade 56-kbps modems to the ITU-approved standard.

NOT WORLD CLASS YET

ALTHOUGH 56-KBPS TECHNOLOGY has its shortcomings, it also has its place—it's one of the few achievable, affordable ways to crack the communications bottleneck we all face every single day. Come on, U.S. Robotics—and the industry—do what you need to have a World Class winner in 1998: Don't oversell 56-kbps capabilities, put superb customer support in place, and deliver on your promises.

Cathryn Baskin is editor in chief of PC World. ■

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PC WORLD Best Buy — December 1996 WinBook XP5 P100 16/810MB DSTN

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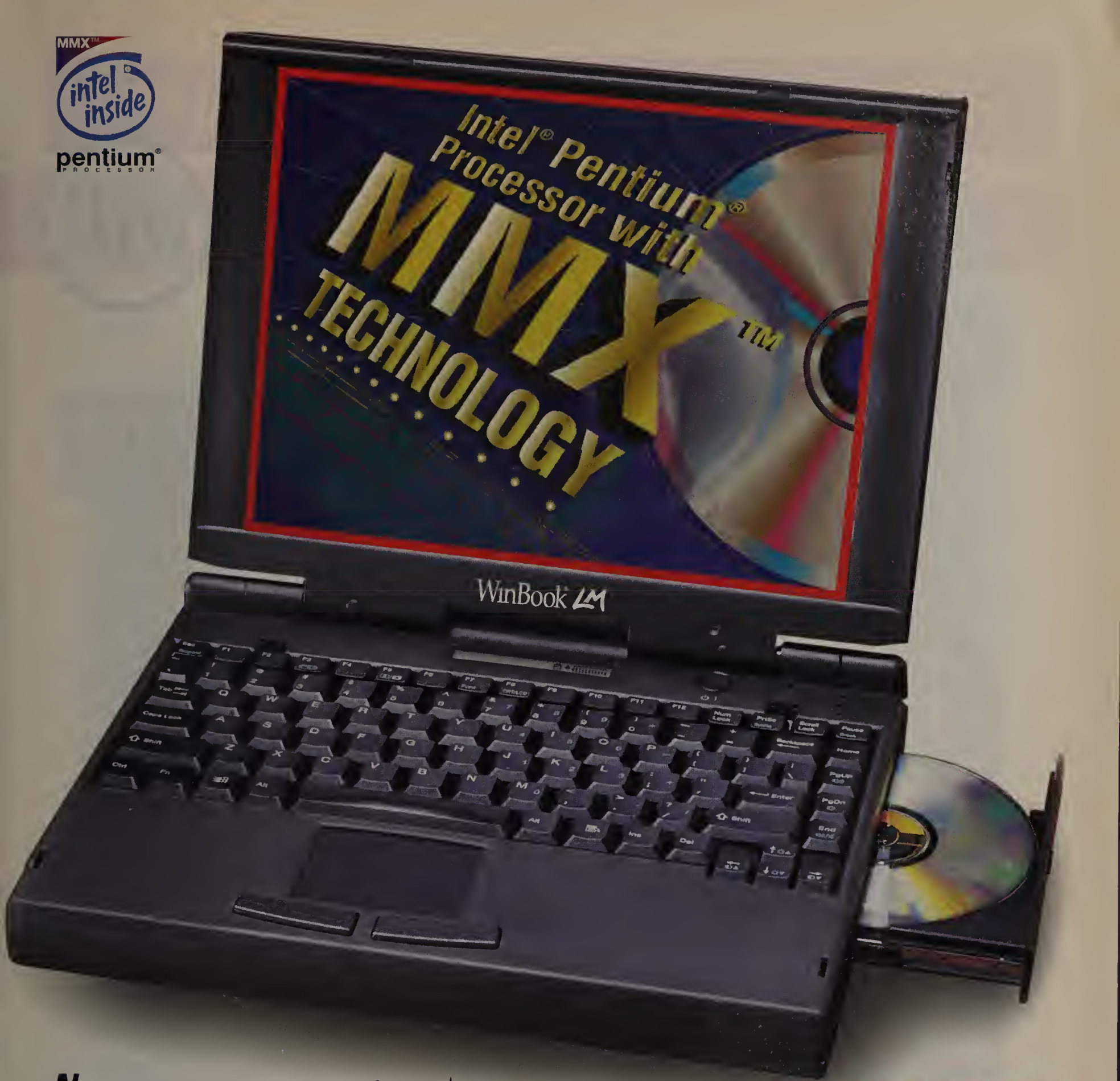

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October 1996 BYTE Best Best Value Notebook WinBook FX

June 1997 PC World Best Buy WinBook XP5 Pro

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August 1996 PC Magazine Editors' Choice WinBook XP5 P100

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- TCO Compliance
- Professional Series

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Circle 224 on reader service card

visioneer

Monday:
Find that expense report from 1993 (the one with the little white lie in it).

Wednesday:
Search through records to find receipts justifying expenses. Stand in line to use the fax machine. Curse the AP department.

Tuesday:
Sort through 1996 paperwork. File some documents. Photocopy others. Recycle the originals. Repeat process until desk is recognizable.

Friday:
Organize marketing research, memos, and sales projections by client, product, and quarter.

Thursday:
Spend six precious hours retyping budget proposals that will probably get rejected, anyway.

Weekend:
Find, retype, and e-mail that newspaper article about the competition to the sales team—in France.

Monday, again:
Fax this batch to the boss, his boss, her V.P., and the entire corporate marketing department.

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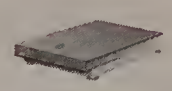
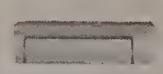
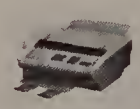

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Circle 187 on reader service card

YOUR TAKE ON: Free stuff online ◆ Scams on the Net ◆ Hard disk parties

SHAREWARE, NOT FREEWARE

ON THE COVER of *PC World's* May issue, the words "Best Free Stuff Online" were displayed. I would like to point out that shareware is *not* freeware. Shareware publishers are in the business to make money. Many of the programs that I use are shareware. I download them for the trial period, then I pay the fee if the program meets my needs. Many people will read this issue and assume that it is okay to not pay for these programs.

Jerry S. Caccavaro, Internet

ALMOST CYBERSCAMMED

THANKS A MILLION FOR your article "CyberScams" [May]. I recently received a proposal from CBSI and I wholeheartedly believed in the operation. In fact, I recently e-mailed CBSI to take them up on their offer to start a home business with my family. Now that I've seen the light, I'll pass up the "offer" and continue with my hard work. Thanks again!

Gabriel Ishola, Internet

NOT ALWAYS A RIP-OFF: BUSINESS ON THE NET

I FELT YOUR ARTICLE "CyberScams" was one-sided at best. Not everyone selling online is a cheat. In fact, I believe you foster ignorance while trying to alert people to scams.

My parents are neither computer savvy nor business oriented. They read "CyberScams," and using the logic from your article concluded that anyone doing business online is ripping people off and that you can't make money online. I make money online without scamming people, and I make smart purchases online without getting ripped off. Yes, some people do get scammed online and some are simply misguided, but not everything on the Net is a rip-off.

Joseph P. O'Neill, Internet

CYRIX-BASED SYSTEMS SUPPORTED

IN RESPONSE TO May's Top 100 introduction, and the comment "Limited support is one of the primary reasons Cyrix-based machines seldom earn Best Buys in our reviews. Companies that use the lower-cost Cyrix chips are usually relatively small vendors, eager to keep costs down": I am a small, one-person computer company providing mobile computer repair, data loss prevention, and sales of new computer systems. I specialize in the mom-and-pop small-business arena. My entire reason for existence is to provide hands-on economical service to these small businesses.

I recently purchased the new Cyrix P200+ CPU on a new motherboard, with 32MB of DIMM memory and a 2.1GB IDE hard drive—it's loaded. This is a really hot system and is selling very well. I not only sell the computer, I deliver it and set it up—and contrary to your article, I support my clients after the sale.

John Benjamin
West Palm Beach, Florida

VOLTAGE AND BIOS PREVENT UPGRADE

I WAS EXCITED to read Kirk Steers's article "Which CPU Is Right for You?" [May], especially the information about AMD's K6. I have a Dell Dimension and have thought about upgrading my Pentium-133 with the K6 chip. I have a ZIF socket so I should be able to replace it easily. But the article seemed to imply that even though the K6 is pin compatible, I would still have problems since it may have different voltage and BIOS requirements. Would you please clarify whether or not I can upgrade my CPU?

Barry Robertson, Internet ▶

HOT BUTTON

AJ's Desktop Themes: Not Free Anymore

I AM ASTOUNDED that you would include AJ's Desktop Themes in your list of "The Best Free Computer Stuff" ["The Best Free Stuff Online," May]. A. J. downloads themes created by other people, changes them to suit his own tastes, fails to give credit to the original creators, charges people to download them, and also puts them on a CD-ROM that he sells. I therefore suggest that you reconsider your recommendation.

Pat Ames, Internet

I HOPE THIS is a coincidence, but it seems that after AJ's Desktop Themes (www.desktopthemes.com) got such a nice review in the May issue, they started charging to download their files. Tsk tsk on them.

David Thompson, Internet

Author's response: We contacted A. J. Russo of AJ's Desktop Themes and got this response: "I began charging access fees in late February of 1997 to cover the cost of upgrading to a full T1, dedicated dual P-100 UNIX server. It was either upgrade or drop the site. The previous server could not handle the amount of requests for downloads, and people were complaining. I do modify most themes to convert them into the space-saving JPEG format. I spend over 30 minutes on each theme standardizing it and making the preview for it, times 630 themes. I put my heart and soul into my site and I really think it shows. So where does the credit go?"

We recommended AJ's Desktop Themes because at the time, it was free and offered several advantages over other similar sites. Since the story went to press, AJ's Desktop Themes has begun charging access fees. We can no longer recommend it as one of the best free sites. —Dylan Tweney

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COMING UP

IN AUGUST

SPECIAL INTERNET ISSUE

From browser tips to bandwidth blues, next month's *PC World* explores the best ways to live and work online.

▶BEST OF THE NET: ONLINE STARS

Lost on the Web? We've got the 100 best Web sites, chat rooms, and newsgroups. From the best place to get tech support at 2 a.m. to the most reliable sites for business advice—it's all here.

▶EASY INTERNET: BROWSER TIPS

Blast off with blockbuster tips for the Communicator and Internet Explorer suites, including tricks for finding Web sites, downloading files, and more!

▶WEB FOR SALE?

Some online ads could be posing as unbiased info. Here's how to know when you're being sold a bill of goods.

▶CRUISING AT HIGH SPEEDS

We examined 56-kbps modems, ISDN, ADSL, cable modems, and satellite and found the best bandwidth options.

▶ESCAPE FROM E-MAIL HELL

Drowning in e-mail? We tested six low-cost to no-cost Internet mail clients and found out which ones deliver.

ALSO NEXT MONTH

▶The PC World Top 100: Check out the Top 20 power desktops, budget desktops, and notebooks, and the Top 10 personal printers, 15-inch monitors, graphics boards, and modems.

▶Here's How: *Upgrade Guide* advises you on replacing your PC's old battery, *Answer Line* tracks down Fatal Exception errors in Win 95, and *Hardware Tips* helps tune up your memory.

PC WORLD

Author's response: You're right. The K6 is pin compatible with the Pentium's Socket 7, but you can't just drop it into an existing Socket 7. BIOS and voltage considerations prohibit that. However, from a manufacturing standpoint, BIOS and voltage are relatively easy to change. This means cheaper systems. By the end of the year, third-party upgrade chips (from Evergreen, for example) that you can just drop into the socket should be available. –Kirk Steers

NET NANNY UPSET

WHILE WE WERE pleased to see Net Nanny mentioned in "Best Ways to Browse the Web" [April], we feel its inclusion in the "Inter-Not!" section of the story was misleading.

Peter Scisco stated that he did not like the DOS monitoring sessions, indicating he reviewed Net Nanny version 2.0 rather than Net Nanny version 3 for Windows 3.1 and Windows 95, which began shipping in December 1996. Version 3 offers many new features, including a familiar and easy-to-use Windows interface that walks the user through installation and setup procedures.

Scisco also didn't like the fact that he had to type in all the information he did not want his kids to have access to. Net Nanny Software International offers free downloadable "good" and "bad" site lists (which are available at www.netnanny.com) for parents or administrators to import directly into the administration program of Net Nanny. These lists are updated monthly and were also available for users of Net Nanny version 2.0. Net Nanny keeps its filtering lists fully editable. Net Nanny also allows users to monitor all applications residing on the computer, in addition to incoming and outgoing e-mail messages.

Jessica Maco, PR manager for Net Nanny

Author's response: Version 3 became available after my deadline. Now, having seen the latest version, I agree that the software is much improved. Installation is better, for example. But I still have to type my own lists of words, phrases, URLs, and newsgroups. Granted, you can download lists from www.netnanny.com, but the word list that I downloaded contained egregious spelling ▶

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errors, and the Web site addresses must be manually updated. –Peter Scisco

HARD DISKS AND THE GOOD OL' DOS DAYS

REGARDING Stephen Manes's column "It's Party Time on Your Hard Disk" [May], truer words were never spoken. In the bad old DOS days, it was at least possible for a reasonably intelligent computer user to determine which files were needed to make the operating system and applications run. If I didn't want an application anymore, I just deleted a few files and was done. Now, I'm afraid to delete anything because of the potentially dire consequences.

Installation programs mysteriously scatter files all over the hard drive. Where did they go? Who knows? Want to download the latest plug-in? How big is it and what does it do? Who knows? Has the swimsuit model you looked at in the online catalog been downloaded to the hard drive? You betcha! Thanks, Stephen, I thought I was the only one.

Steve Litchfield, Jackson, Mississippi

SCSI DORK

WHILE READING THE May issue, I came across Steve Bass's "SCSI: The Miracle Upgrade Device." I have been a Macintosh user for years and agree fully that SCSI is much better than IDE. But how can he finally figure this out and insinuate that Macintosh users are slow—"Macintosh users have been using SCSI devices for years—how tough can it be?" What a dork!

Travis Nicholl, Orem, Utah

PC World *welcomes your responses, ideas, and other letters to the editor.* *See page 14 for contact information.* ■

CORRECTIONS AND CLARIFICATIONS

"THE NEW Power Players" (*Top of the News*, June) gave an incorrect price for the Sys Technology Performance Pro 266; that machine actually sells for $4369. The article also failed to note that the system uses the Epox motherboard, with a maximum RAM capacity of 1GB, rather than an Intel motherboard. *PC World* regrets the errors.

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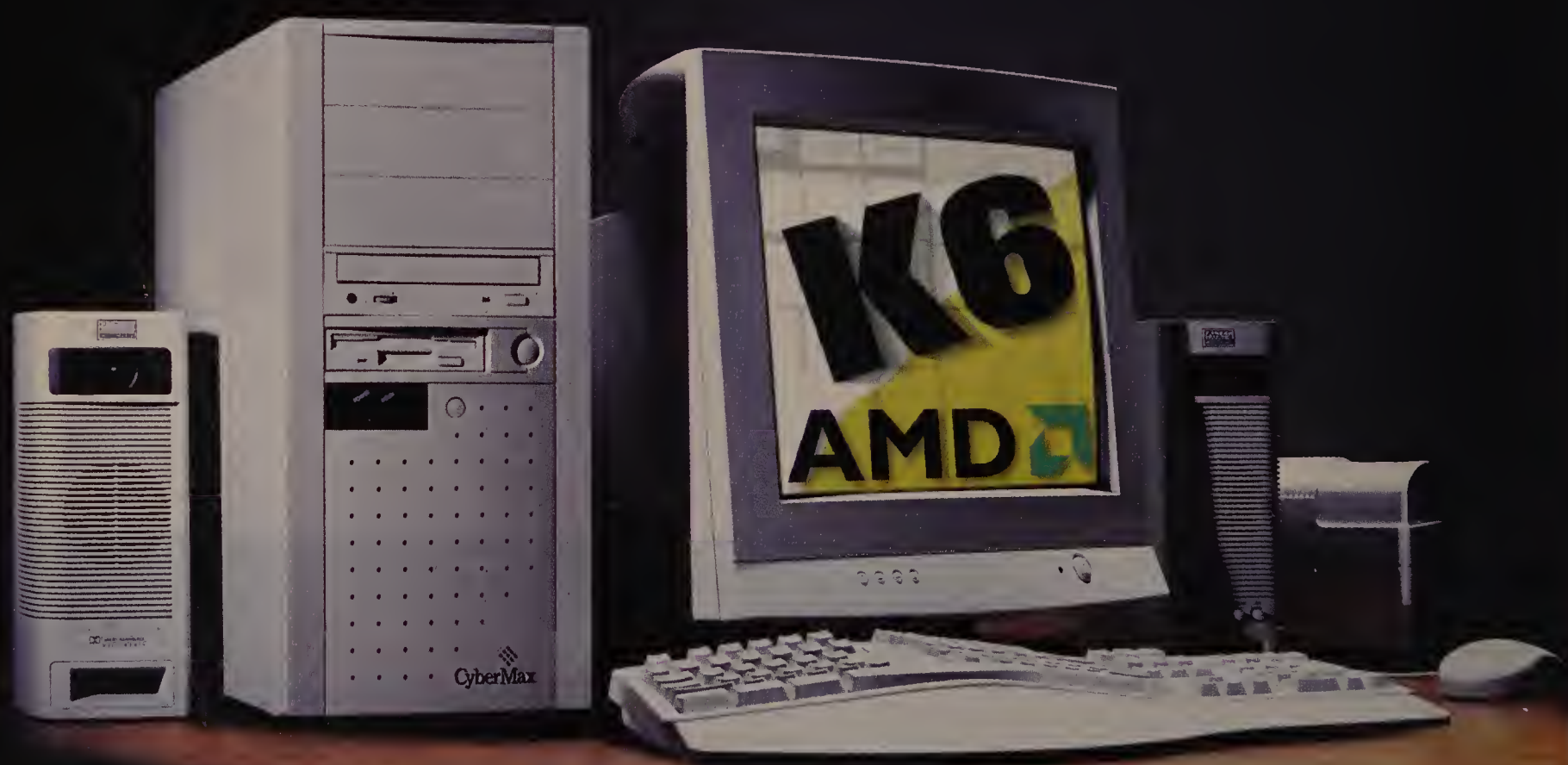

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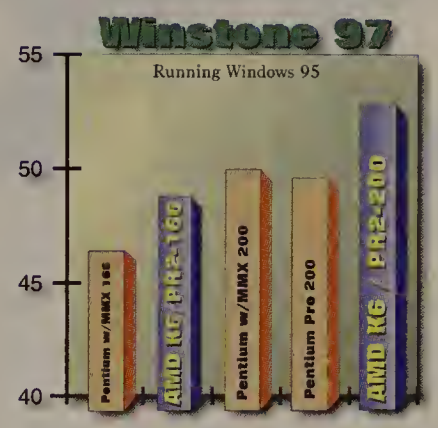

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Online Travel: Time vs. Money

Travel Web sites offer 24-hour convenience, but that often comes at a higher price.

ILLUSTRATION: GORDON STUDER

BEFORE I QUIT THE corporate life, traveling for business was easy. I'd just call Michael in the travel department, tell him where I was going and when I needed to be there, and the tickets would turn up a few days later via interoffice mail. Now, when I travel for work—or for fun—I'm on my own.

My first few business trips as a self-employed person were simple: one city each trip, no need for a car. Two calls—one to United to cash in my frequent flyer miles and book my flight, another to reserve a hotel room—and the trip was booked. But with three excursions scheduled in the next few months (a graduation in Idaho, a wedding in Portland, Oregon, and a business conference in Atlanta, with a side trip to Charleston, South Carolina), I figured it was time to seek professional help.

I needed a way to track down rates and flight times and come up with the best options to fit my schedule and my budget—without spending all day at the task.

I've heard the hype about the great travel services available on the Web. I've even subscribed to American Airlines' NetSaver service, a weekly electronic mailing list that promotes discounted prices on select American routes. (You can subscribe on its Web site, www.americanair.com.) I've never been able to take advantage of the cheap fares, since they're available only for certain cities, but I continue to check it religiously just the same. You never know; I might someday need a quick getaway to Dallas–Fort Worth.

But is cyberbooking easier or cheaper than using a travel agent? I decided to find out. I chose two popular Web-based travel services: Expedia (www.expedia.com) and Travelocity (www.travelocity.com). Then I called my AAA travel agent, whose no-frills service has served me well in the past.

The most appealing aspect of online trip planning is that the sites are always open (a big plus for me, since I tend to get most things done during unconventional hours). So instead of having to make all my arrangements between 9 and 5, I can wait until the kids are in bed and *Chicago Hope* is over.

AND THE HUNT BEGINS

I STARTED WITH Expedia, a travel service by Microsoft that you can use to research and book flights, hotel rooms, and car rentals. Before I could get down to business, I had to register. That took about 10 minutes.

Expedia's fill-in-the-blanks interface is fairly straightforward. With the Flight Wizard, for example, I simply told it how many people were traveling, arrival and departure dates and cities, and specific search criteria (particular airlines, direct flights only, cheapest fare, and so on). Here's where I ran into my first hassle: We were traveling to a small town in Idaho and I had no idea whether Twin Falls, Idaho, or Salt Lake City would be closer.

A travel agent could have told me, but not Expedia, so I guessed and typed 'Salt Lake City'. In less than a minute, Expedia came up ▶

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with two flights from Oakland that met my criteria. Both were on Delta, both with a total round-trip fare of $560 for four. Since I knew that Southwest Airlines flies that route and often offers discounted companion fares, I went back a screen to change my search criteria and take a look at Southwest-only options. No such luck. It turns out Expedia doesn't handle Southwest flights. And, as I later learned, even some travel agents don't have electronic access to Southwest reservations.

Since I had no choice, I added one of the Delta flights to my itinerary and moved on to the Rental Car Wizard. No shortage of options here—11 models, ranging from $34 to $56 per day. Cheap was the order of the day, so I added the $34 car to my itinerary. Total time for fare hunting and booking: 35 minutes.

On to Travelocity, based on the powerful Sabre travel reservation system operated by American Airlines and used by travel agents. The interface is a little more cumbersome than Expedia's. For example, when entering information for departures and arrivals, I had to provide a city and state (you can't just type 'Salt Lake City', for example) or, for quicker results, a three-letter airport code. Some codes are obvious, but not all of them, which means I ended up jumping over to the identify-the-destination screen pretty frequently to fill in all the blanks on the entry screen.

JUST THE INFO YOU WANT

ON THE PLUS SIDE, I had more options for customizing the information I wanted. For instance, instead of Expedia's requirement that I select just one airline, Travelocity let me choose four, in order of preference (or, as with Expedia, have it search its database for all available airlines). I could also prioritize preferences by prices, flight times, and airline. My favorite feature, though, is the speedy airport locator. Just type in your destination city and state, and up pops a list of airports and the distance of each from your ultimate destination. Neat.

Like Expedia, Travelocity came up with the two $560 Delta flights. It also offered a third option, though: a $560 fare for four on Southwest (so much for those cheap companion fares). The car rates were also about the same, ranging from $36 to $60 per day. Total time spent with Travelocity: 25 minutes.

I needed a hotel room in Atlanta and found Travelocity's selection to be much more extensive than Expedia's. Among the lengthy list of choices was a hotel recommended by the conference I would be attending, so I checked availability and booked a room there. I was hoping to stay in a small inn while in Charleston, but Expedia didn't offer information on bed-and-breakfasts. While Travelocity offered many hotel/motel choices, including bed-and-breakfasts, Expedia accessed only one: the pricey Charleston Place Hotel, with rooms starting at more than $225 per night.

Too late for this trip, I discovered the Ultimate Bed and Breakfast Directory at www.touristguide.com/b&b. It lists and illustrates bed-and-breakfast inns all over the United States (with links to directories in other countries) and includes detailed descriptions and prices, even photos. When I added Charleston, South Carolina, to the search criteria, it came up with 43 bed-and-breakfasts for me to choose from.

With printouts of all my online options in hand, I logged off and called my AAA travel agent to see what she had to offer. She came up with the same flight information as Travelocity and Expedia, with one important exception: Some of the fares were lower. Instead of $560 for ▶

BEFORE YOU GO

ONLINE TRAVEL PLANNING TIPS

- Don't assume the online rates are the cheapest. Call a travel agent, too.
- Check several sites—the selection varies considerably from one travel service to the next.
- Read the fine print. Quoted rates usually don't include taxes and surcharges.
- Confirm your online reservations with the airlines, hotels, and rental car companies. This lessens the chance of booking errors or miscommunications.
- If you travel on a particular airline regularly, it's worth checking its Web site for direct bookings, frequent flyer bonuses, and personal seat-selection maps.

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Circle 184 on reader service card

the round-trip tickets to Salt Lake City, she got me companion-fare tickets (I *knew* they were available somewhere) on the same Delta flight for a total of $484—or $76 less than the online services offered. The Portland trip netted a similar savings: $440 for four tickets on Alaska Airlines, instead of the $512 quoted by both Expedia and Travelocity for the same flight on Alaska. Savings so far: nearly $150.

Now I was eager to move on to the final trip. Who knows, maybe I'd save enough to stay in Charleston an extra night. No such luck, though. The travel agent quoted me the same fares on the same flights as both online services: $1100 for two round-trip tickets on Delta. And, oddly enough, the car rental rates quoted by the travel agent were a few dollars *more* than those offered by either Expedia or Travelocity. Total time spent booking with the travel agent: 15 minutes.

IS CONVENIENCE WORTH IT?

YES, THE ONLINE travel services are convenient. I can book flights, rooms, and cars at 3 a.m. or 3 p.m.—whenever the mood strikes me. Sometimes, as with the rental cars, they even proffer the best deals around. But not always. Had I booked flights on either Expedia or Travelocity, I would have paid close to $150 more than necessary. That's a substantial chunk of change. Plus, as smart as these services are, you can't ask them questions the way you can a travel agent, or get the promotional or membership discounts to which you may be entitled.

So what will I do for my next trip? Probably the same thing I did this time. I'll check online, call a travel agent, and then book with whoever has the best prices. It's not as convenient as calling Michael in the company travel office, but this is my money, so the savings are definitely worth the extra research time.

Send an e-mail about this topic or any consumer concern to consumerwatch@pcworld.com. Roberta Furger is a PC World *contributing editor. Her book on girls and computing,* Does Jane Compute? *will be published by Warner Books in December.* ■

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The Paper Trail in Oakland.

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2 TODAY, LONELY PLANET WRITERS TRAVERSE THE WORLD *for new places to stay, to eat, to experience. Previously released versions are routinely updated and guides to new destinations are introduced.*

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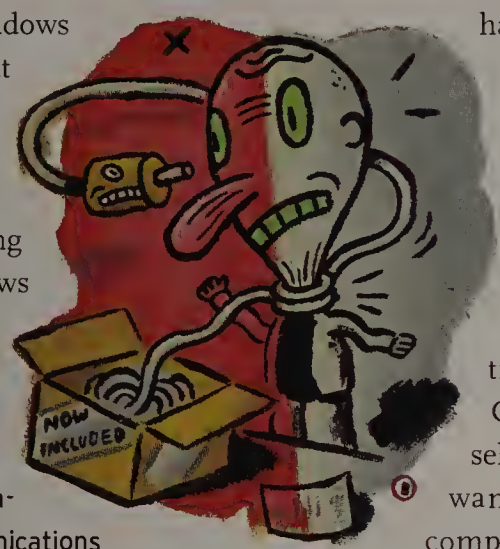
Seagate's packaging deceptive? ◆ Raw deal on used Gateway ◆ Best Buy blues

I'VE BEEN DECEIVED

I BOUGHT A Seagate Tape-Stor 800, and on the box it says "Free Backup Exec Software Upgrade for Windows 95! Now Included." But inside I found 16-bit software called Seagate Backup for DOS/Windows and a flyer offering Backup Exec for Windows 95 for $49.95. This is false advertising.

Peter Villanyi
Spring Hill, Florida



Editor's response: Seagate's corporate communications director, Woody Monroy, explained that the program highlighted on the Tape-Stor 800 box and the software inside were actually the same product. "The original Backup Exec was renamed Seagate Backup following Seagate's merger with Conner Peripherals in February 1996," reports Monroy. "The product shipped with the renamed software, but we didn't make the name discrepancy clear on the box."

The flyer in the box was there to let customers know that a 32-bit version, costing $49.95, was also available. This program was a stand-alone product, not an upgrade. Seagate apologized to Villanyi and sent him the 32-bit software, plus three Travan tapes, all free of charge. (A new version costing $99 retail is now available.) Villanyi reports he is very happy with the resolution.

ILLUSTRATION: GARY BASEMAN

SECOND OWNER LOSES OUT?

I PURCHASED A USED Gateway 2000 Solo laptop in January 1997, and I'm very happy with it. However, I was recently shopping in the store where I bought it, and overheard the manager talking on the phone to Gateway. I learned that the manager was trying to buy parts, but Gateway was refusing to sell them because the store wanted the parts for used computers. Does this mean that if my laptop breaks I won't be able to get it repaired because of Gateway's refusal to supply parts?

Marc D'Ambrosio, Internet

Editor's response: A Gateway spokesperson confirmed that the company's standard warranty policy supports only the original purchaser. "Ownership is not fully transferable to a secondhand buyer," the spokesperson said. The reason? Gateway's policy is designed to protect the original owner in case the PC is stolen, for instance. Also, transferring historical data about each system from the file of one owner to another is no simple task. Gateway attempts to maintain an inventory of parts unique to older systems, but it cannot do so with every single part. That doesn't mean D'Ambrosio won't be able to get his computer fixed, though: He can use generic parts for most repairs. At press time Gateway reported it is evaluating new programs like transferable warranty plans for portables. No details were yet available.

Before you buy a used PC, be sure to check what coverage you're entitled to.

NO SERVICE, NO COST?

MY WIFE HAD problems with the power button on her Acer system, so we brought it back to Best Buy for repair. The technician found nothing wrong; he guessed that the jostling during the drive to Best Buy had fixed the power button. They still insisted on charging $47.95. When I got the PC home, it worked fine. But that charge isn't justified because Best Buy didn't fix it.

Richard Manlove, Wheaton, Illinois

Editor's response: Pete Cermak of Best Buy consumer relations apologized to Manlove and explained that even though Best Buy didn't repair the system, a technician spent a substantial amount of time performing tests. "The $47.95 is a reflection of the amount of time required for the diagnostic check," he says. Manlove received a $50 gift certificate from Best Buy but still wasn't happy. Our advice? Read the fine print carefully when you authorize service at any repair center.

RAPID REPAIRS

I BOUGHT A Texas Instruments Extensa 575CD laptop with 8MB of RAM in December 1996. Six weeks later I tried to upgrade to 16MB and got different error messages every time I booted the PC. After replacing the memory three times and trying all sorts of troubleshooting methods without success, I finally called tech support. TI picked up my system via FedEx, and seven days later I got my laptop back fully repaired, all under warranty. I am truly impressed. TI has a customer for life!

Nelson L. Goodwin
Fort Washington, Maryland

Think you've gotten a raw deal—or a great one? PCW Advocate *wants to hear the details at advocate@pcworld.com. We'll investigate complaints and publish items of the broadest interest. Aoife McEvoy is a staff editor for* PC World. ■

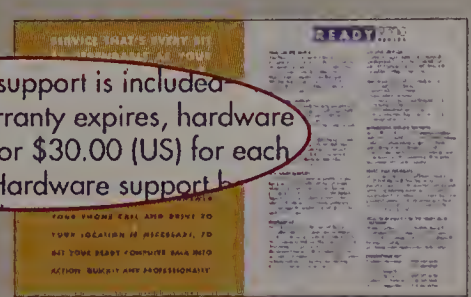
THE FINE PRINT

"LIMITED" SOFTWARE SUPPORT: SO, WHAT'S THE DEAL?

HOW IS SOFTWARE support handled on a new PC? The policies vary from company to company. This support documentation for NEC's Ready series, for instance, includes information on "limited" telephone support. What's the scoop?

1. Software that is preinstalled on Ready machines comes with free phone support for 90 days at a toll-free number, 24 hours a day, seven days a week. How is it limited? NEC will attempt to answer all software-related issues, but only up to a point. If your questions are very in-depth or technical, you'll probably be referred to the software manufacturer.

2. If you know you're going to ask for software support, check to make sure how long the time frame is—and when it starts. NEC's policy states that the 90-day period begins when you first get phone help from a technician during your standard one-year warranty.



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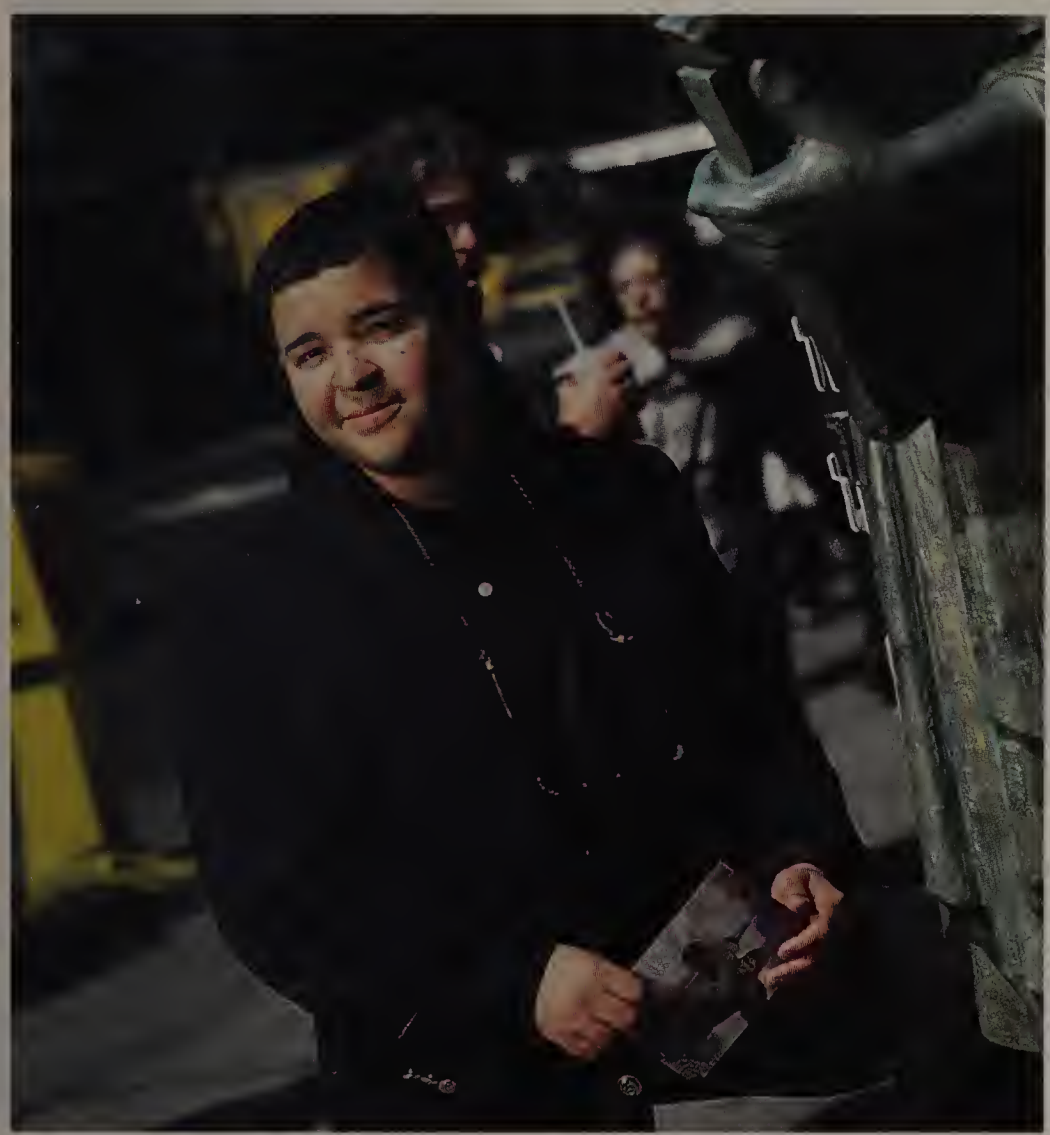
Circle 232 on reader service card

Install ISDN and Shed No Tears

Retail Communications art director Gregory Etheart needed a fast data connection for his business but dreaded installing ISDN. Then he discovered an easy way out.



PHOTOGRAPH: JOHN ABBOTT

THE PROBLEM When you need to transmit files and surf the Web at high speeds, an Integrated Services Digital Network line is the most affordable option. But the complexity of configuring an ISDN line to work with a particular modem or router has been known to reduce some stout-hearted souls to tears. This month Gregory Etheart, an art director at the New York–based advertising agency Retail Communications Corporation, explains how his company avoided the ISDN installation blues. —*Editor*

We're a relatively small ad agency with some big-name clients—Calvin Klein, Giorgio Armani, and Tiffany's among them. In this competitive business, we must move quickly and meet deadlines. We have to stay up on the latest trends, including surfing the Internet, downloading software updates, and exchanging e-mail messages.

We were using 28.8-kbps modems and regular telephone lines. But the wait for Web pages to scroll across the screen was too long. There was a more serious problem, too. Whenever we had a last-minute change to a layout, we needed to send updated files to our printer in Chicago—but our only viable option was transmitting files with our 28.8-kbps modems. That could tie up a computer for three or four hours, and frequently the connection would drop and we'd have to start all over—or the file would be corrupted and we'd have to send it again.

The solution to all this seemed obvious: Get a digital connection to the outside world. Being a small business, though, we couldn't afford a dedicated T1 line. That left us with ISDN. But we'd heard the horror stories about how frustrating it can be to configure an ISDN router or modem. While I have a fairly good grasp of technology, I'm not a telecommunications expert, nor is anyone else at our company. It was clear we would need help setting up the two ISDN lines we wanted to install (one for each of our Ethernet networks).

THE SOLUTION: HIRE AN EXPERT

I WASN'T SURE where to find that help, though. We had hired a company to network our PCs and Macs, but its fees were high and we weren't thrilled with the result. Then we heard about Up & Running, Guaranteed, a national ISDN service from Farallon Communications that promises to handle all the dirty details for you.

Up & Running is available for individuals and businesses that have a Farallon Netopia ISDN modem or router. When you sign up for the service, a rep asks about your network or PC. The rep then calls your local ISDN provider, tells the provider what kind of network environment or computer system you're using, sets up your ISDN account, and schedules the installation.

In addition, Farallon will usually work with one of its Internet service providers to set up your ISDN Internet account. But at the time—the fall of 1996—Farallon didn't have any ISP partners in the 212 area code of Manhattan. ▶

As a result, I had to interview several ISPs and set up the ISDN Internet account on my own. But once I set up an account, my Up & Running representative got in touch with my new ISP, then called me with the setup information I needed to get onto the Internet. (At press time, a Farallon spokesperson said the company had 110 ISP partners nationwide, with 12 in the New York metro area. —*Editor*)

But here's the best part: The folks at Farallon—not me—took care of remotely configuring our Netopia routers to work with our ISDN lines. And they did it without having to come to our office. We bought two Netopia routers from Farallon that came with 19.2-kbps PC Card modems along with Farallon's Timbuktu Pro remote access software. Farallon's technical support people were able to dial in to our routers and remotely make all the software adjustments. Along with the Up & Running service, the package cost us about $3000—and was well worth it, considering the increased bandwidth we got and the peace of mind we enjoyed because Farallon took care of the details.

The Up & Running service includes a year of tech support, but we've used it only a couple of times. Soon after the installation was completed, I noticed that a file downloaded from the Web more slowly than it should. I called Farallon, and a rep went through the possibilities with me and discovered that a channel on the ISDN line hadn't been properly initialized. The rep contacted Nynex (our ISDN provider), and Nynex fixed the problem.

Since we've been using ISDN, Internet access seems almost instantaneous. Web sites pop up in seconds, and it takes very little time to download software updates. We're also saving a lot of time getting files to our printer. A file that used to take an hour to transmit now takes about 15 to 20 minutes. Because we now have a fast way to send and receive files, our ISP has set up a File Transfer Protocol site for us. We can now upload files to the FTP site, and our printer can go there to download the file. This keeps us from having to deal with the inconvenient direct modem-to-modem transfer we previously used.

I also use the FTP site when I work at home. The only problem is, I'm using a 28.8-kbps modem at home. Maybe I'll get an ISDN connection there, too—now that I know I don't have to set it up myself.

Edited by James A. Martin

• Up & Running, Guaranteed $499 (street) for each workgroup or router, $99 (street) for individual users; Timbuktu Pro for Windows $139, twinpack (street); Farallon Netopia ISDN modem $349 (street); Farallon Netopia ISDN router $699 to 1099 (street); Farallon Computing, Inc.; 800/759-7761; www.farallon.com

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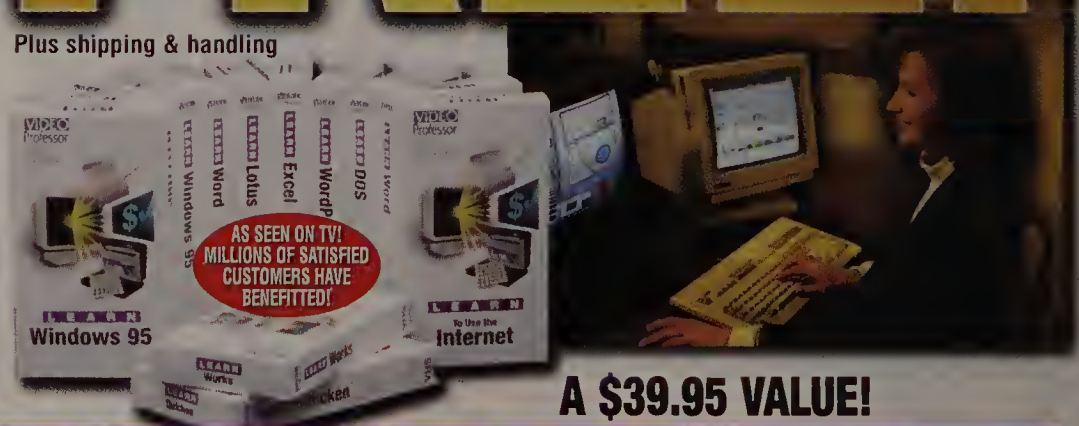

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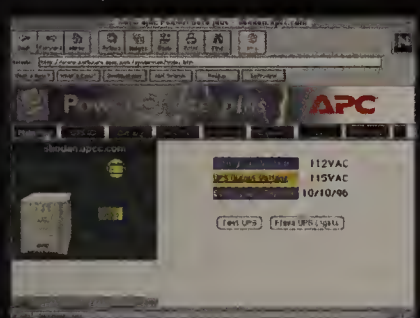

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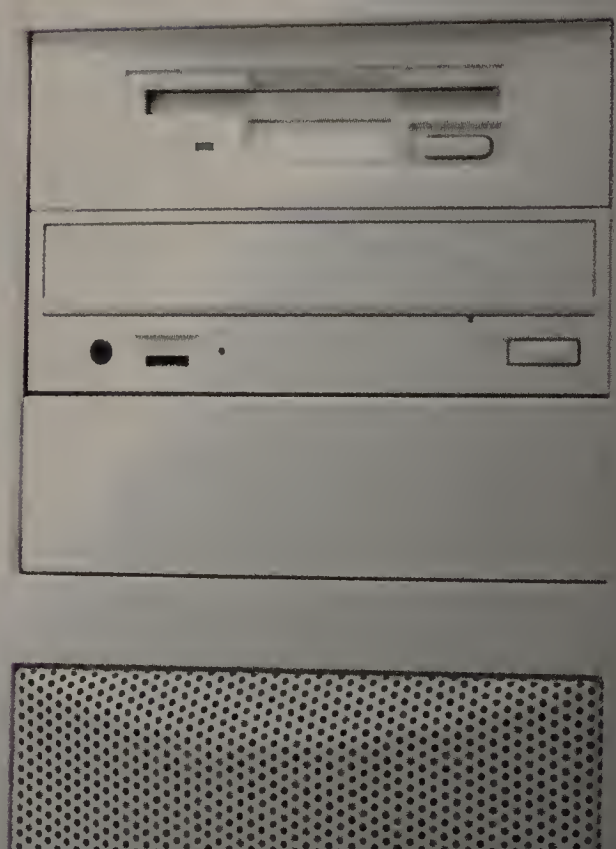

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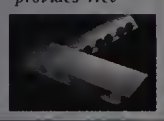

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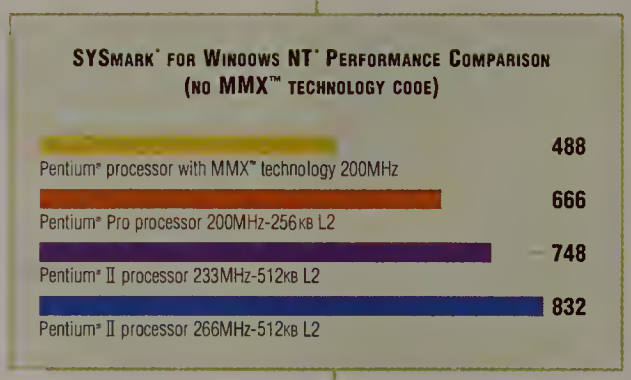

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► www.intel.com/PentiumII

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ADI

Office 97's e-mail and First Aid 97 problems ◆ Norton Utilities security fix

Outlook 97 Patches Privacy Problem

IF YOU'RE SENDING e-mail through Microsoft Office 97's Outlook application, you may be letting everyone know who you're corresponding with. That's because Outlook's Internet Mail service mistakenly includes blind-carbon-copy addressees—names on your address list that are supposed to be invisible to other recipients—in the message's header information. Outlook doesn't display header information when you view messages, but other mail programs do.

To fix this, Microsoft has released a beta version of the Internet Mail Enhancement Patch for Outlook 97. You'll find a link to the 500K update file at www.microsoft.com/OfficeFreeStuff/Outlook. In addition to fixing the blind cc: bug, the update adds new features that serious Internet mail users require. The most notable is the ability to leave copies of messages on the server—a real convenience if you want to read the same e-mail on two different computers. Other improvements include the ability to quote original messages in replies using standard prefix characters such as > and :, support for multiple mail accounts, disabling of Rich Text Format message content by default, and a fix for a problem that causes mail messages from some POP3 servers to be delivered with a date of 2/1/97.

FIRST AID 97 CLASHES WITH OFFICE 97

BUG Your system may crash if you run CyberMedia's First Aid 97 and any Microsoft Office 97 application at the same time.

FIX The most recent First Aid patch fixes the conflict. Click First Aid 97's Update button to download and install the 1.6MB patch using the included Oil Change utility, or read CyberMedia's detailed instructions on manually updating the program (www.cybermedia.com/products/firstaid/update97.html).

NORTON'S INSECURE UTILITIES

IT'S THAT OLD ActiveX acting up again, and this time its cohort is Symantec's Norton Utilities. Symantec was chagrined when rival utility vendor McAfee Associates discovered and publicized a potential security hole in Norton Utilities 2.0. Seems that if you've got version 2's ActiveX-based System Genie installed and you're surfing the Web with Microsoft's Internet Explorer, your system is open to attack from ActiveX controls that unscrupulous developers can put on their Web pages. Both Symantec and Microsoft agree that the fault is Symantec's. As we went to press, there were no known cases of anyone using this flaw for malicious purposes. But now that McAfee has, uh, let the genie out of the bottle, such abuse is suddenly likely.

The simplest way to update your copy is through Norton Utilities' LiveUpdate feature. Start Norton System Doctor, right-click the *LiveUpdate* panel, and choose *Launch LiveUpdate.* (If LiveUpdate isn't there, select *View•Options•Active Sensors* and add *Norton Utilities LiveUpdate.*) For more extensive LiveUpdate instructions, see www.symantec.com/nu/lu48.html.

If you'd rather download and install the 1.3MB patch manually, go to the Symantec Web page sos.symantec.com/ftp/nutilftp.html and click on the link to nu20ptch.exe.

PROCOMM STOMPS A BUG SWARM

HAVING TROUBLE WITH your copy of Procomm Plus 4.0 for Windows 95? You may want to download the 1.7MB version 4.01 update. You can find this on Quarterdeck's FTP server at ftp.datastorm.com/pub/pw4-us/w4uu0001.exe. The company also lists the 50 most significant bugs fixed in the new version at its Web page support.quarterdeck.com/patches/pw4uu0001.html.

If you installed Procomm using the CD Minimal option, however, the patch is no solution, since the problem files reside on your CD-ROM. To order a new disc, call Quarterdeck at 800/354-3222 or 573/443-3282.

Files from this article are available on PC World Online (www.pcworld.com/software_lib). Scott Spanbauer is a PC World *contributing editor.* ■

IN BRIEF

PartitionMagic 3.03

POWERQUEST CONTINUES to refine its fixes to PartitionMagic. The latest revision (3.03) fixes an NT File System-related problem in the progress-report graph, properly updates Windows NT's boot.ini file when you add and remove partitions, and smooths an installation error. The update files for versions 3.0, 3.01, and 3.02 (525K to 625K) are at www.powerquest.com/download/update3.html.

New Matrox Drivers

ACCORDING TO MATROX, the latest drivers for its 3-D graphics adapters boost performance, add new PowerDesk features, and eliminate printing errors. Millennium drivers are at www.matrox.com/mgaweb/drivers/ftp_mill.htm. Mystique fixes are at www.matrox.com/mgaweb/drivers/ftp_myst.htm.

BUGGED?

FOUND A HARDWARE OR SOFTWARE BUG? Tell us about it via e-mail at bugs@pcworld.com.

ICON: JEFFREY PELO

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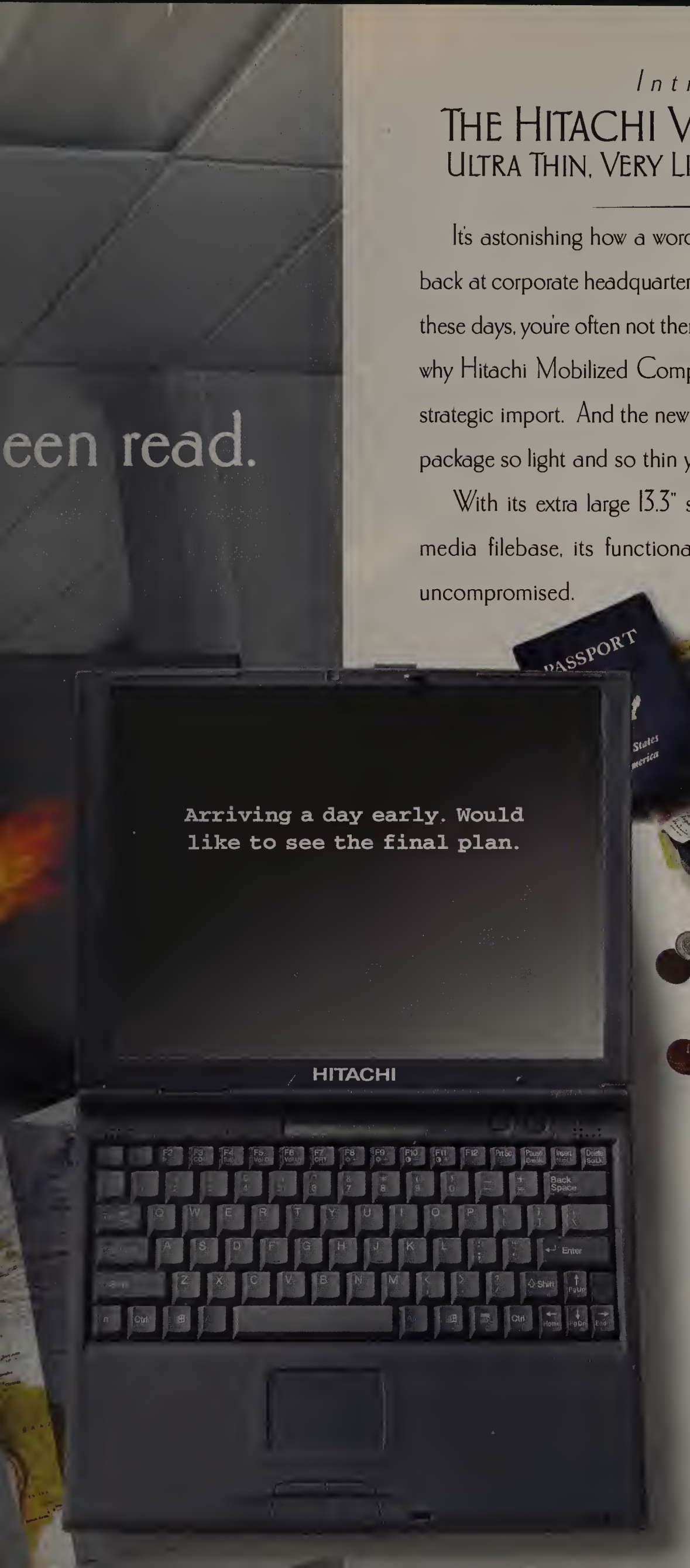

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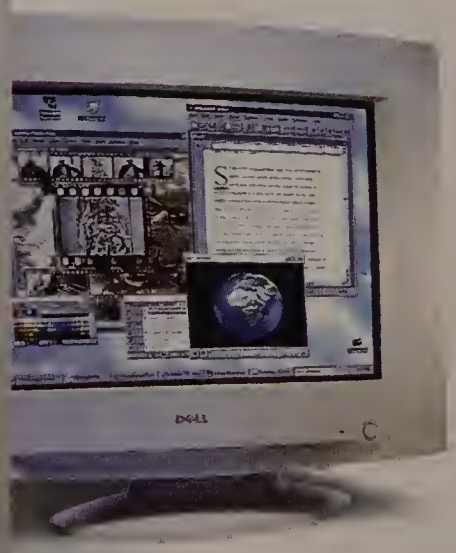
TOP OF THE NEWS

Affordable Computers Never Looked Better

GREAT NEWS: You no longer need to spend top dollar to buy a powerful computer. But take a deep breath because in the past two months vendors have produced a perplexing array of products. In our May and June issues we wrote about the first Advanced Micro Devices K6 and Intel Pentium II-266 systems; now Pentium II-233 and Pentium MMX-233 systems have also arrived. The new PCs overlap dramatically in both price and performance; sorting out which one to buy is more complex than ever.

To make it easier on yourself, first assess your needs. If you require absolutely top business and multimedia performance, choose a Pentium II-266 PC. You can find a loaded Pentium II-266 system for as little as $3000.

For more modest needs, systems based on the AMD K6-PR233, Intel Pentium II-233, or Intel Pentium MMX-233 are effectively comparable in performance, within a few percentage points on average. Nearly all run both business and multimedia software extremely quickly, so you don't need to buy the most expensive model. In general, this means you can pass over systems based on the Pentium II-



MID-RANGE SPEEDSTERS: Dell's Dimension XPS M233s and (opposite) Gateway 2000's G6-233M.

PHOTOGRAPHS: JOHN GREENLEIGH; DIGITAL ILLUSTRATION: NICK FAIN DIGITAL; ICONS: JEFFREY PELO

Can't buy the fastest power systems? Take heart. New 233-MHz Pentium MMX computers are great deals—even better than new 233-MHz Pentium IIs.

233, which average $100 to $300 more than comparable units based on the Pentium MMX-233 or K6 processor.

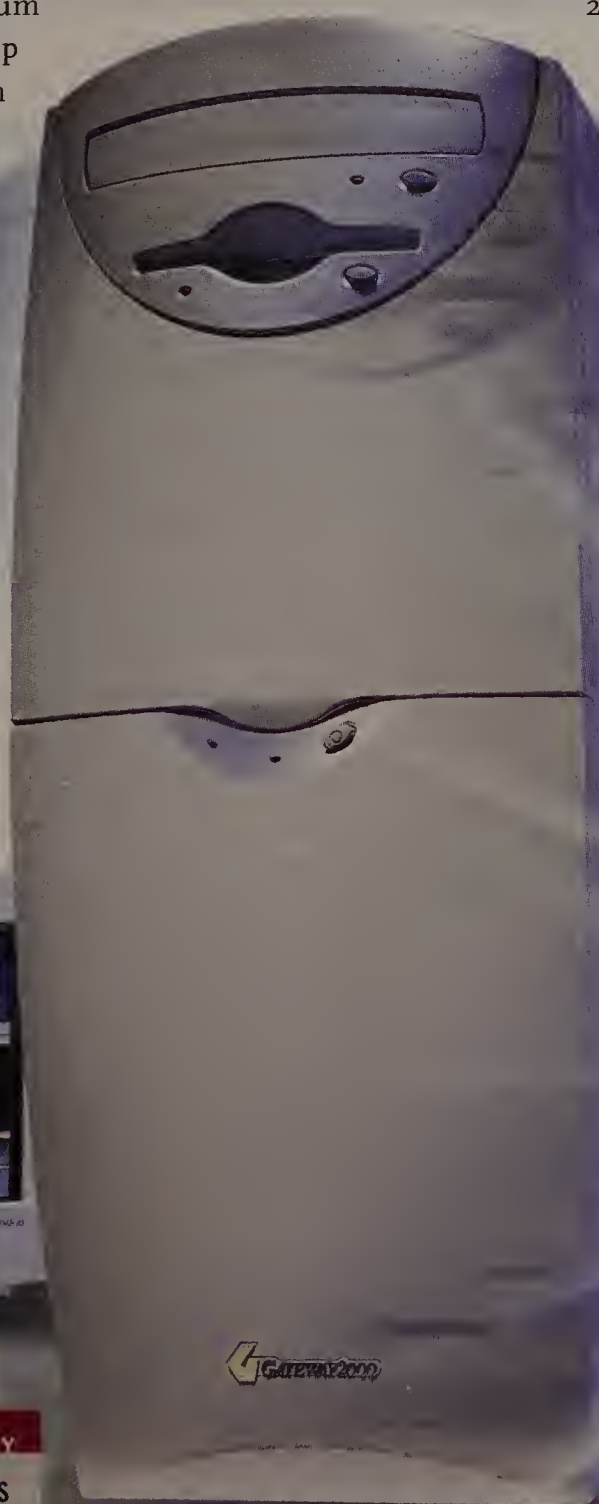
A CROWDED FIELD

THE PENTIUM II, which supports the MMX instruction set found in Pentium MMX processors, is Intel's foreseeable future. The Pentium II-233 is the bottom of the Pentium II line. The Pentium MMX-233 chip is the top member of the Pentium MMX family, and perhaps the last of its kind.

If you're currently using a Pentium system without MMX technology and upgrade to a Pentium II-233 or a Pentium MMX-233, you will notice a real difference in your work with business and multimedia applications. Your choice between a Pentium II-233 and a Pentium MMX-233 will likely come down to price; the two types of systems have similar performance with real-world tasks, and so far neither processor technology offers upgrade options.

Just how fast are they? *PC World* tests show both Pentium II-233 and Pentium MMX-233 systems crank right through business applications—in most cases, their speed difference from that of a Pentium II-266 is less than 10 percent. It's only in multimedia tests that the Pentium II-266 demonstrates substantially more power.

The Gateway 2000 G6-233M—fastest of the three Pentium II-233 systems tested—scored an impressive 251 on the PC WorldBench business-productivity test suite. The average score for Pentium II-266 machines was 261. Thus this Gateway Pentium II-233 system is only about 4 percent slower than the fastest ▶



EDITED BY
Charles Piller and Randy Ross

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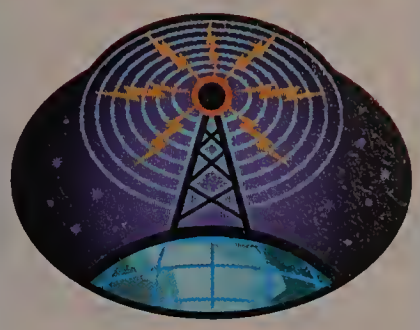

Microsoft Prepares Word 97 Fix

IN MID-JULY MICROSOFT will release a free, downloadable service release that fixes backward-compatibility problems in the Word component of its Office 97 suite. Currently, Word 97's file format is not compatible with previous versions of Word. The Save As Word 6.0/95 option actually saves files in Rich Text Format, or RTF, with a .doc extension. This glitch has created numerous headaches for users, including formatting problems, error messages, and incorrect characters. It also makes files much larger than expected. The service release will eliminate the automatic saving of files in RTF format.

Compaq Ends $35 Support Fee

AFTER MONTHS of complaints from customers, Compaq has rescinded its policy of charging $35 per tech support call for its Presario line of PCs during the warranty period. Customers will still pay $35 per question, or $2 per minute (up to a maximum charge of $30) via a 900 line after the warranty period. Compaq also announced a quadrupling of its online support staff, and expects to respond to online queries within 48 hours. ▶

INTERNET

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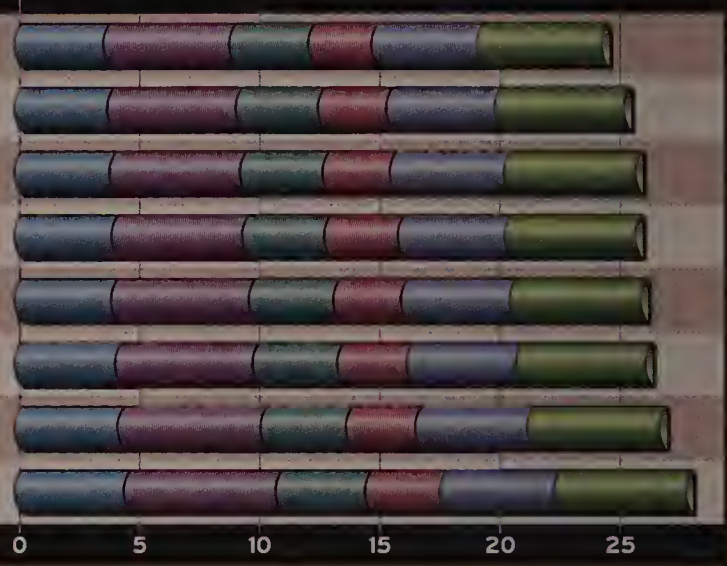
Plenty of Power for Mid-Range Systems

PENTIUM MMX-233 SYSTEMS NEAR PENTIUM II-233 SPEEDS

SYSTEMS	CPU	RAM (MB)	Secondary cache (K)	PC WorldBench score
Average for 6 Pentium II-266 PCs	Pentium II-266	32	512	261
Gateway 2000 G6-233M	Pentium II-233	32	512	251
Quantex QP6/233 SM-3	Pentium II-233	32	512	247
AST Bravo LC 6233	Pentium II-233	32	512	244
Dell Dimension XPS M233s	Pentium MMX-233	32	512	243
Gateway 2000 G5-233	Pentium MMX-233	32	512	240
Quantex QP5/233 SM-3	Pentium MMX-233	32	512	236
Average for 9 Pentium MMX-200 PCs	Pentium MMX-200	32	256	231



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Excel 7.0 for Windows 95 · Paradox 5.0 for Windows · 1-2-3 release 5 for Windows

STRONG MULTIMEDIA SYSTEMS

SYSTEMS	Macromedia Director movie viewing (Frames per second)
Average for 6 Pentium II-266 PCs	93
Gateway 2000 G6-233M	88
Quantex QP6/233 SM-3	88
AST Bravo LC 6233	96
Dell Dimension XPS M233s	86
Gateway 2000 G5-233	86
Quantex QP5/233 SM-3	81
Average for 9 Pentium MMX-200 PCs	81

Adobe Photoshop image editing · Ray Dream Studio 3D redraw

How We Test

Business applications: We tested all systems with PC WorldBench, PC World's Windows 95 application-based benchmark. Higher scores are better. For a description of PC WorldBench 1.0 tests, see PC World Online (www.pcworld.com).

Multimedia applications: We tested each system using a series of MMX-enabled applications. In Adobe Photoshop 4.0, we time several image editing operations. In Fractal Ray Dream Studio 3D, we time how long it takes to redraw rendered 3-D scenes at two levels of complexity. In Macromedia Director 5.0, we play a graphics-intensive Director executable file.

Data based on testing conducted by the PC World Test Center. All rights reserved.

class of PCs we've ever tested.

The problem is that Pentium II-233 PCs don't cost much less than Pentium II-266 machines—perhaps $200 to $300. The Gateway 2000 G6 model with 16-bit wavetable sound, speakers, and a 56-kilobits-per-second x2 modem is $2769 (a model without these components from Gateway or AST costs $2499). A comparable Pentium II-266 system from Quantex costs only $2999.

Pentium II-233 systems may make more sense this fall when the Accelerated Graphics Port, a technology expected to speed 3-D performance, should arrive. Serious gamers and multimedia enthusiasts may want to wait.

With strong price/performance, Pentium MMX-233 systems make sense for many people right now: Our testing shows that systems using the Pentium MMX-233 chip nearly equal Pentium II-233 systems' performance. Two of the machines tested, the Dell Dimension XPS M233s and the Gateway 2000 G5-233, made quick work of the PC WorldBench tests with scores of 243 and 240 respectively. That means they're only 3 to 4 percent slower with business applications than the Gateway 2000 G6-233M, which is a Pentium II-233. In multimedia tests, the XPS M233s and the G5-233 were even closer to the performance of the Pentium II-233. Gateway 2000's $2687 Pentium MMX G5-233 costs $82 less than the company's Pentium II model.

If price is your top priority, Quantex's QP5/233 SM-3, shipping for only $2449, sounds awfully good—even as the slowest of the bunch, its PC WorldBench score of 236 tops nearly all PCs tested until two months ago. For example, the average score for Pentium-200 MMX PCs is 231.

PENTIUM II-233: HARD TO JUSTIFY COST

THE PENTIUM II-233 systems we tested from AST, Gateway 2000, and Quantex showed just slight differences in performance—PC WorldBench scores ranged from AST's 244 to the Gateway 2000's 251. The average PC WorldBench score of 247 for a Pentium II-233 exceeds the Pentium Pro-200 average of 228 by about 8 percent, and the Pentium-200 average of 214 by 15 percent.

All three Pentium II-233 systems offer 32MB of RAM, 512K secondary cache, Universal Serial Bus ports, and 12X/16X CD-ROM drives. These "16max" drives work at 16X speed on the outer portion of a CD-ROM disc but at 12X speed on the inner parts.

Among the Pentium II-233 machines, the Gateway 2000 G6-233M offers the best combination of performance and price, at $2769 with a 17-inch monitor. (The Quantex QP6/233 SM-3, $2799 with 17-inch monitor, is quite similar.) For $2499, Gateway 2000 has another model without the 16-bit wavetable sound, speakers, or Telepath 56K modem. It offers a richer configuration than the AST Bravo LC 6233, which costs $2499 with a 15-inch monitor, or $2700 with a 17-inch monitor. The AST's 2.1GB hard drive is the smallest, and its graphics accelerator has the least amount of video memory, 2MB. This is offset, however, by AST's fast video chip set, integrated on its motherboard; it even outpaced the Pentium II-266 average for our Macromedia Director test.

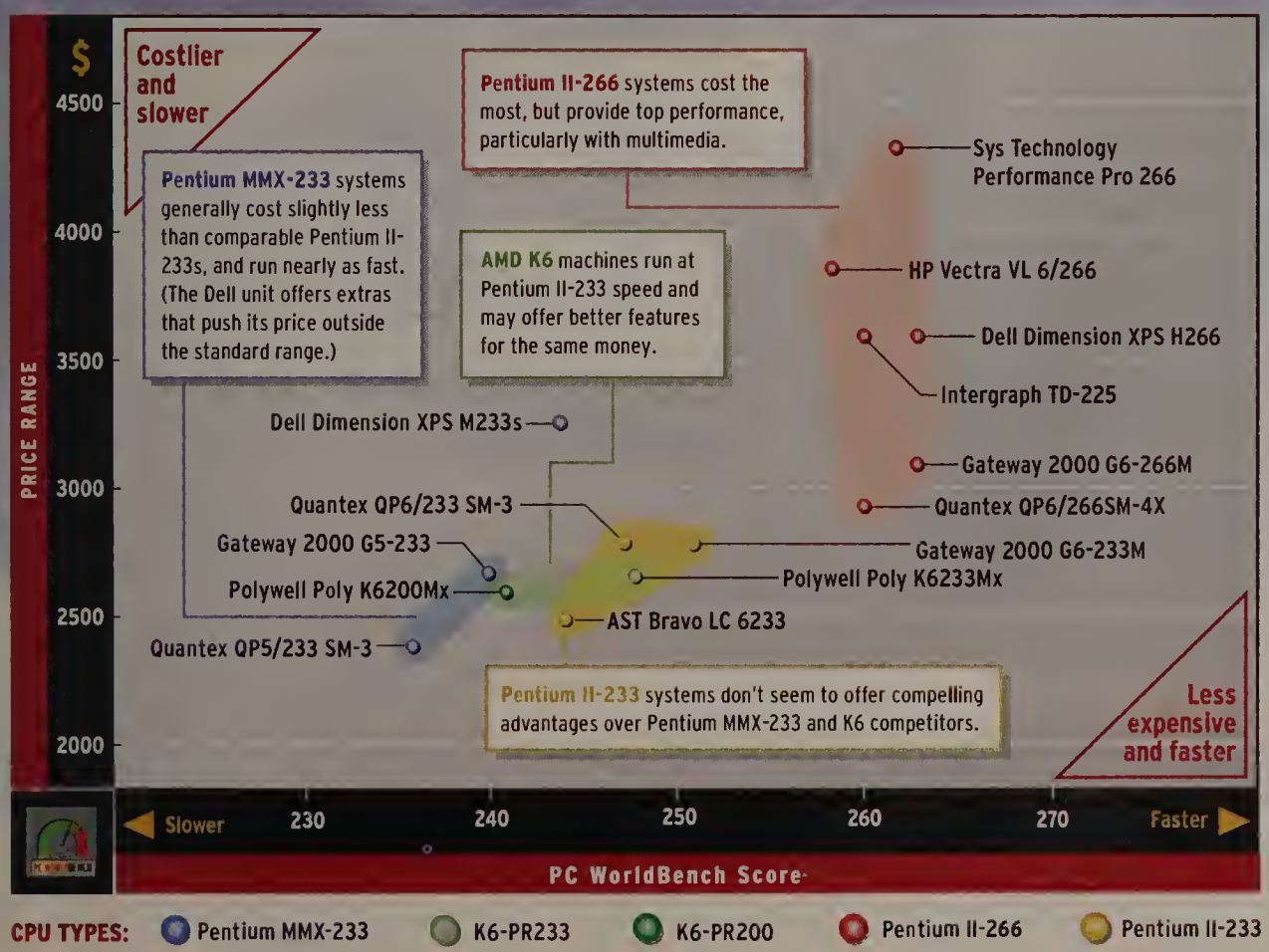
But overall, these Pentium II-233 PCs perform so much like less-expensive Pentium MMX-233 systems we tested that you may not be able to justify the small extra cost.

PENTIUM MMX-233: STRONG CONTENDER

THE PENTIUM II-233 systems did better than the Pentium MMX-233 systems—but only by a small margin in many cases, even in multimedia tests. For example, the Pentium II-233 and the Pentium MMX-233 systems took ▶

System Shopping: Consider the Best Price/Performance Combination

CONFUSED by the dizzying proliferation of new chips appearing in today's PCs? Many systems are quite close in performance and price, so less-expensive PCs may not be much of a compromise. This chart shows performance for business applications; bear in mind that the Pentium II-266 enjoys a greater advantage in multimedia applications.



JUST IN

Iomega Recalls Some Jaz Cartridges

IOMEGA IS RECALLING roughly 75,000 Jaz disk cartridges due to a faulty component that could cause eventual performance problems and data loss. To tell if a disk cartridge is affected, check the date and manufacturing code etched toward the center of the disk above the inscription "(c) Iomega 1995 patents pending." If the date falls within the period March 13, 1997 (03 13 97) to April 20, 1997 (04 20 97), *and* if the letters and numbers below the date end with "MS," you should replace the disk. The company estimates the problem affects 20,000 disks in the United States and 55,000 abroad. To return a disk, call Iomega at 800/336-1314. Replacement disks will be mailed along with a postage-paid return envelope to return the recalled disk.

Online Services Settle With FTC

AMERICA ONLINE, CompuServe, and Prodigy have agreed to settle allegations by the Federal Trade Commission that the online services' "free trial" offers resulted in unexpected fees and withdrawals from consumers' debit accounts. The proposed settlements, announced by the FTC in May, may involve refunds and are open to comment until late June. The FTC will decide final terms soon afterward. To obtain updates and more information, call 202/326-2710, or visit the FTC's Web site at www.ftc.gov/opa/9705/online.htm. ▶

STRONG OPTIONS FOR AFFORDABLE SYSTEMS

	SYSTEMS	Price [1]	Drive type/ size (GB)	Graphics board	Modem (kbps)	Warranty for parts/labor (years)	Reader service number
PENTIUM II-233	AST Bravo LC 6233 800/876-4278 www.ast.com	$2700	EIDE/2	2MB S3 Virge/DX [2]	–	1/1	782
PENTIUM II-233	Gateway 2000 G6-233M 800/846-2000 www.gw2k.com	$2769	EIDE/3.2	4MB STB Virge/GX	56 [3]	3/3	783
PENTIUM II-233	Quantex QP6/233 SM-3 800/896-4898 www.quantex.com	$2799	EIDE/4	4MB Matrox Millennium II	33.6	3/1	784
PENTIUM MMX-233	Dell Dimension XPS M233s 800/388-8542 www.dell.com	$3229 [4]	IDE/6.4	8MB Matrox Millennium II	33.6	3/1	785
PENTIUM MMX-233	Gateway 2000 G5-233 800/846-2000 www.gw2k.com	$2687	EIDE/3.2	4MB STB Virge/GX	56 [3]	3/3	786
PENTIUM MMX-233	Quantex QP5/233 SM-3 800/896-4898 www.quantex.com	$2449	EIDE/4	4MB Matrox Millennium II	33.6	3/1	787

[1] With 17-inch monitor, and 12X/16X CD-ROM drive; drives operate at 12X for inner portion, 16X for outer portion of disc.
[2] Integrated on motherboard.
[3] Uses x2 technology.
[4] With ACS290 speakers and AWE32 wavetable sound.

All products: 912

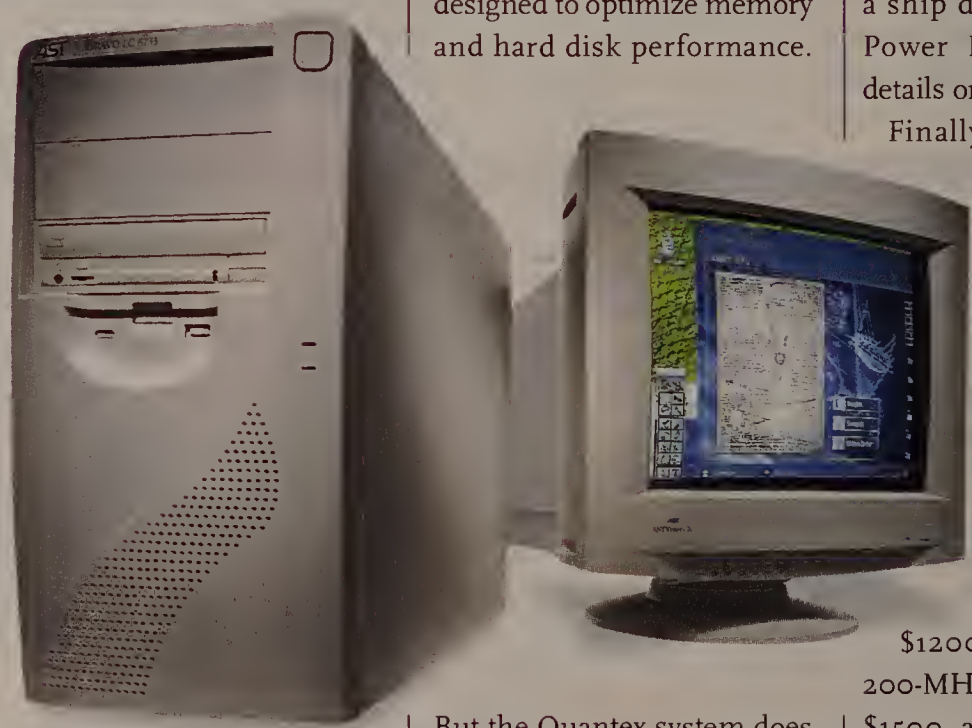
about the same time to perform our 3-D rendering tests. In our Photoshop image-editing testing, Gateway and Dell Pentium MMX-233 offerings nearly kept pace with the Pentium II-233–based units.

The fastest Pentium MMX-233 system, the Dell Dimension XPS M233s, logged a PC WorldBench score of 243—almost as fast as the AST Pentium II. This Dell system owes its speed in part to its Matrox Millennium II graphics accelerator with an unusually hefty 8MB of on-board video memory. It also uses a speedy IBM 6.4GB hard drive. But the Dell is pricey at $3229 with 17-inch monitor, though part of that price pays for extras like an internal Iomega Zip drive. (Without ACS290 speakers and AWE32 wavetable sound, the price drops to $3049.)

The Gateway 2000 G5-233, a Pentium MMX-233 system with 17-inch monitor, makes a more affordable choice at $2687—$82 less than its Pentium II-233 sibling. The G5-233 performed almost as well as the Dell, with a PC WorldBench score of 240.

Then there's the Quantex QP5/233 SM-3. This PC delivered the slowest performance of the three Pentium MMX-233 systems, with a PC WorldBench score of 236. But that's still not bad—only about 3 percent slower than the Dell on business apps. The Quantex also falls only slightly behind in video and rendering tests. In image editing tests the Quantex loses a large step—apparently hampered by a comparatively slower hard drive. Still, for buyers who don't need top-level multimedia speed, the $2449 Quantex is a great buy.

Ironically, the Quantex is the only Pentium MMX-233 PC we tested that incorporates Intel's new 430TX chip set, designed to optimize memory and hard disk performance. But the Quantex system does not use a hard drive that takes advantage of the 430 TX chip set. Pentium II machines use a different chip set.



PENTIUM II-233 ON A BUDGET: AST's Bravo LC 6233.

PHOTOGRAPH: JOHN GREENLEIGH

MORE BUDGET OPTIONS

THERE'S ONE OTHER processor you should consider before buying a Pentium II-233 PC: The AMD K6-PR233. New 233-MHz K6 systems such as the Polywell Poly 500 MX8 offer performance at the Pentium II-233 level for less cash.

By the time you read this, Polywell should have shipped its Poly 500 MX8, based on the K6-233. At $2688, it costs $81 dollars less than Gateway 2000's Pentium II-233 G6-233M. The K6-233 runs a little slower in multimedia tasks. (AMD is also producing a 200-MHz version that is noticeably slower for multimedia.) K6 systems have also been announced by Everex, Micro Express, Robotech, and Sys Technology.

There's one hitch: While K6 systems are fast and affordable, at press time Digital was the only top-tier PC vendor that had announced it would use the processor, and the company had not announced a ship date. (See "The New Power Players," June, for details on K6 systems.)

Finally, if you'd prefer to spend less, there's one more option. As we went to press, Intel slashed prices on the plain Pentium chips. By the time this appears, many 120- and 133-MHz Pentium systems may sell for as little as $1200 to $1300; 166- and 200-MHz versions will sell for $1500, and $1600 to $1700, respectively.

But think hard before you buy one. If you need a very basic office system or a rock-bottom price on a home PC, these relative slowpokes make sense. But they will be outdated quickly—particularly for multimedia—as demands

from new MMX-tuned software increase.

If you need a sub-$2000 PC, you'll benefit from patience, says Linley Gwennap, editor of *The Microprocessor Report*. Over the next few months, prices on Pentium MMX systems will continue to fall.

The Pentium MMX-233 may be the last Pentium MMX chip, Gwennap says. Intel is turning its attention to the Pentium II for both the corporate and home markets.

Is there any reason to avoid a Pentium MMX-233? None that we can see. There are just two issues to note. First, the Pentium II chip has a faster secondary cache. That cache can speed up work in applications that often store large data sets in cache, such as spreadsheet programs. It could also help for software that caches frequently. That seems like a bonus for the P-II systems, but our tests show that systems based on the two processors perform nearly the same.

Second, Intel has not announced whether it will offer an upgrade chip akin to the OverDrive for earlier Pentiums. Indeed, Intel has not detailed an upgrade path for Pentium II, and you won't see any upgrades before 1998, says Gwennap. And given the rapid decline in system prices and the concurrent advance in peripherals technology, it's not clear that any CPU upgrade will work for most buyers.

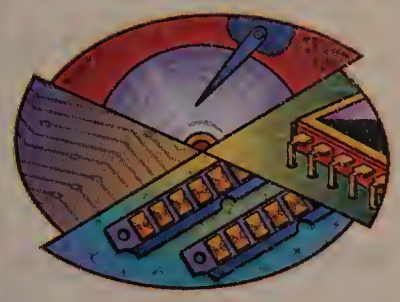
If you need a sub-$2000 PC, you'll benefit from patience as Pentium MMX system prices continue to fall.

Not quite ready to choose? The first systems with Cyrix's new M2 chip will arrive soon. They should compete closely in performance and price with K6, Pentium II-233, and Pentium MMX-233 systems. Sorting out this pack of processors takes time, but means strong choices for consumers.

If you want an eminently affordable, fast PC, K6 and Pentium MMX-233 systems are hard to beat. Paradoxically, the fastest systems in this roundup—the Pentium II-233s—are neither fish nor fowl. They're not enough faster than their competitors to justify the extra cost. For top multimedia performance, skip Pentium II-233 and spend slightly more for systems based on its more powerful 266-MHz sibling. In any case, with so many sweet spots in the systems market, you're bound to find a good deal.

—Laurianne McLaughlin ▶

JUST IN



TidBytes

CHEAP INTERNET TV: WorldGate Communications says it will soon release an affordable Web TV service that works with a standard TV and a cable converter. It is expected to add $4.95 to your monthly cable bill for e-mail capability and 3 hours of Internet access. **DIGITAL INSIDE?** Digital and Cyrix each filed lawsuits in May accusing Intel of patent infringement. Digital alleges that Intel copied technologies used in Digital's Alpha processor line. Digital has tried to block shipments of PCs based on Intel processors, but analysts doubt this will happen in the course of the legal fight.

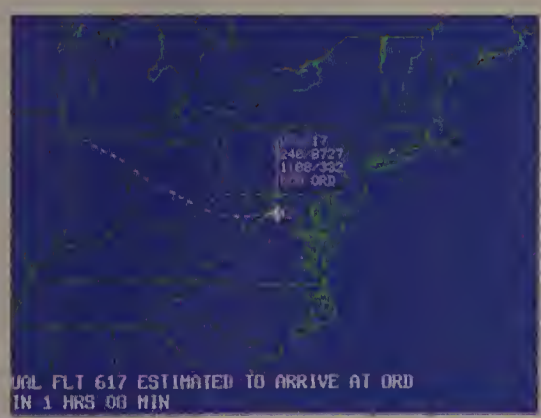
WEB BROWSER

Use the Web to Reduce Travel Trauma

LIKE A CAB RIDE through Mexico City, frequent business travel can be exhausting, daunting, and risky. A little research on the Internet can prevent some nasty surprises.

If you plan to travel outside the United States, start with a visit to the Department of State's home page (www.state.gov). The Travel Warnings/Consular Info section discusses current security hazards. For example, due to the number of violent taxi robberies in Mexico City, at press time this section included a warning from the U.S. Embassy in Mexico City advising Americans to use only taxis from authorized taxi stands (CTO). Site information also includes passport, visa, and vaccination requirements, and health risks associated with particular countries. There's even a downloadable form if you need to renew your passport. Unfortunately, you'll have to print it out and mail it in.

Tips and travel bargains abound on the Epicurious Travel Web site (travel.epicurious.com). The Terminally Hip feature can save time and confusion when visiting unfamiliar airports. Enlargeable terminal maps are available for more than 100 domestic airports, plus listings of distances to downtown areas. You'll also find bus, rail, and taxi information, including fares and schedules. And this site can save you money if you book your own travel: It lists discounts of up to 70 percent on airlines, hotels, and car rentals. At press time, an economy round-trip ticket from New York to Paris was offered for $288—nearly half the cheapest rate we could find through an agent. The site also lets you participate in airline fare auctions, which can provide significant savings. Caveat emptor: "Deal searching" requires a lot of surfing and, occasionally, submitting your name and address to unsecured e-mail databases.



BIZTRAVEL'S IN-FLIGHT TRACKING offers real-time details on flights in progress.

Biztravel.com (www.biztravel.com) provides In-Flight Tracking, a unique feature that lets you check the progress of any domestic flight. Here's how it works: Enter the airline, flight number, and destination. Presto! You see a map of the United States, with a superimposed aircraft icon plus tags indicating aircraft type and estimated time of arrival.

—Randy Legge

The Airborne Office: Modems, Power Connections Fall Short of Claims

CONSUMER ALERT

EVER SINCE in-flight phones began supporting modems several years ago, the promise of airborne computing—fueled by slick advertising—has tempted the business traveler. That temptation is about to become irresistible as airlines launch electrical service that can power a notebook indefinitely. Has the in-flight office finally arrived?

That depends on your definition of an office. If money is no object, the ability to operate your notebook without batteries worth some aggravation, and sporadic access to e-mail acceptable, then the answer is yes. Otherwise, the office in the sky remains pie in the sky.

INCONVENIENT CONVENIENCE: Airlines plan to provide electrical outlets, but airborne computing comes up short.

PRICEY POWER

THE NEW ELECTRICAL service will not be widely available for some time. Currently, Primex Aerospace's EmPower is the only in-flight power system certified by the Federal Aviation Administration. EmPower is being rolled out by American, Delta, United, and several other carriers. The service will appear first in business and first-class on planes used for long flights. Primex expects EmPower to appear in 300 planes by year-end.

Plugging into an EmPower socket requires a special adapter similar to those used to draw power from car cigarette lighters. But you will need a special connector designed for your brand and model to plug into an EmPower socket. Currently, Absolute Battery, Lind Electronics, Universal Sources, and Xtend Micro Products make adapters. Prices range from $70 to $99.

In some cases, you may not need to buy an adapter. If you're traveling on American and already own an adapter that can be plugged into a cigarette lighter, you're all set.

EmPower's current monopoly on in-flight electrical service may not last long. At least two other service providers are likely to obtain certification within the next year, says FAA engineer Jon Dimtroff. But it's unlikely that these fledgling services will require proprietary adapters.

SNAIL E-MAIL

IN-FLIGHT PHONES have been around for over a decade. Service is available from market leader GTE Airfone or from AT&T Wireless Services. But modem support from these vendors is only a few years old, and immaturity shows.

These phones do not support all PC Card modems, and it's tricky to determine if your particular device will work. The only way to confirm that you're airplane-ready—before being airborne—is to ask your PC Card vendor or in-flight service providers to check on your specific model.

Even if you make a connection, premature cutoffs are too common and performance is slow. GTE supports speeds of up to only 2400 bits per second; AT&T tops out at 4800 bps.

PC World editors conducted informal tests with both services and concluded that sending and receiving e-mail was not worth the time and expense. We made nearly two dozen attempts on three airlines during a variety of domestic flights. We were successful about one-third of the time. Moreover, the slow connection speeds didn't cut it.

Perhaps the biggest drawback to in-flight calls is the astronomical pricing: At press time, GTE Airfone charged $2.99 to connect and $3.28 per minute for calls within the continental United States, while AT&T Wireless cost $2.99 to connect and $2.99 a minute for domestic calls.

Until in-flight electrical and communications services get up to speed, the airborne office will be the domain of those willing to pay for the convenience of computing in the wild blue yonder.

—*Yardena Arar* ▶

Absolute Battery
800/829-8294, www.absbatt.com
READER SERVICE NO. 775

Lind Electronics
800/697-3702,
www.lindelectronics.com
READER SERVICE NO. 776

Universal Sources
800/439-3214
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800/232-9836, www.xmpi.com
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PHOTOGRAPHS: JOHN ABBOTT

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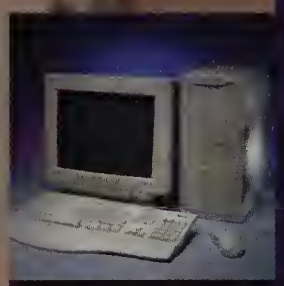
QUIN-55 (Pentium® processor & Pentium® processor with MMX™ technology based PCs)

APRI-31/32 (Single/Dual Pentium® Pro processor based PCs)



APRI-74 (Pentium® II processor based workstations/servers)

DTN-5M (Pentium® processor with MMX™ technology based notebooks)

You're savvy about PC systems. You know what you need and what you want. And our line of award winning QUIN-55 PCs offers you a world of networking choices. Our economical NetPC desktop system can help reduce your total cost of ownership as well as the complexity of managing your PC environment. It includes a 133MHz Pentium® processor and runs Microsoft® Windows® operating systems. Need more power? Our cost efficient workstations/servers are available with a 200MHz Pentium® processor, 200MHz single or dual Pentium® Pro processor, or a 266MHz Pentium® II processor to run Windows NT™. Client presentations? Consider our budget-friendly line of DTN-5M notebooks that feature a 150MHz or 166MHz Pentium® processor with MMX™ technology.

Best of all. These systems can be custom configured to the way you work. From components to peripherals, you name it, we'll do it. Your way. To discover the DTK price/performance difference, contact your reseller. Or call 1-800-BUY-A-DTK (1-800-289-2385).

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Indianapolis 317/872-8850	Milwaukee 414/679-7870	Minneapolis 612/557-1973	Kansas City 913/492-3800	Dallas 972/484-8535	Houston 281/568-6688	Scottsdale 602/451-6774	Los Angeles 818/810-0098	

Circle 84 on reader service card

Windows 97 Software Suites: No Fix for Speed Freaks

WHEN IT comes to performance, we've never had anything good to say about Windows 95 business software suites. The last time we tested the suites (see "Software Suites: Corel Takes On Microsoft and Lotus," September), we called Corel's WordPerfect Suite 7 "mediocre" and described the Lotus SmartSuite 96 version of Word Pro as "molasseslike." Microsoft Office 95 was the fastest suite but "that's not saying much," we complained. In our March issue ("Lotus SmartSuite 97: Now Smart Enough?"), a preproduction version seemed faster than its predecessor.

BAD NEWS

WE'VE NOW tested shipping versions of Lotus SmartSuite 97 and Microsoft Office 97 along with earlier versions SmartSuite 96 and Office 95—and not very much has changed. SmartSuite 97 was about 6 percent faster overall than SmartSuite 96, mainly because of 1-2-3 release 97's glacial printing performance. Office 97 was actually 12 percent slower than Office 95 in our tests. Moreover, Office 95 held on to first place, but not by much. We couldn't formally test Corel's new WordPerfect Suite 8 because a shipping version wasn't available at press time. We did examine a preproduction version of the suite; see "WordPerfect Suite Tightens Integration, Improves Web Features."

The news isn't all bad. The newest versions of several Lotus and Microsoft applications were considerably faster than their predecessors. In addition, the performance of old and new suites improved an average of two to three times going from a Pentium-90 system with 16MB of RAM to a Pentium MMX-200 system sporting 32MB of RAM. The newer suites improved the most on the faster systems. This is good news if you plan to buy a new PC—the newest version of your suite will make the most of all that power.

How much weight should you give performance in the upgrade equation? It depends on which apps you use frequently. But if a suite doesn't provide the features that you need, speed is meaningless.

If you're unhappy with the performance of your current suite and contemplating an upgrade, you need to weigh all the options. Sure, a shiny new Pentium MMX-200 or Pentium II system will speed up your applications, but can you spare $2000 to $3000?

Adding 16MB of RAM to a 16MB computer will run about $80 to $100 and will no doubt improve the performance of any suite. By comparison, the SmartSuite 97 upgrade carries a street price of $150; the Microsoft Office Professional Edition, which includes Access 97, is available for about $350.

Overall, **performance differences** between the new and old suites **don't justify upgrading.** To speed things up, consider more RAM or a faster PC.

UPS AND DOWNS OF PERFORMANCE

WE TESTED the main applications in each suite on a Pentium-90 and a Pentium MMX-200 test system. The PC World Test Center revamped the tests used in our September performance story, adding nine new tests including eight specifically designed for Windows 95 databases. We beefed up previously used tests for common tasks like launching applications, opening files, and printing—one of the most time-consuming tasks. This drastically affected the results for spreadsheets and presentation graphics.

For spreadsheets, graphics and databases, we defined printing as the time it took an application to fully process a file and then allow us to continue working unimpeded. In September our tests measured only when an application returned control of the cursor. For example, Office 95's PowerPoint 7.0 scored exceptionally well in September—but even though the application returns your cursor, you can't get much work done because the application is still processing the file to be printed. In our latest tests, we included processing time. As a result, PowerPoint 7.0 fell behind Lotus Freelance versions 96 and 97.

We also calculated scores without printing times to reflect an application's actual performance. Here's an overview of our results. ▶

ILLUSTRATIONS: HANK OSUNA

BREAKTHROUGH!

Fix-It™ is the easiest way to find and fix Windows problems. Guaranteed!

Quarterdeck Fix-It is the breakthrough you need to solve system problems, conflicts and errors in Windows 95. And unlike Cybermedia's First Aid, Fix-It has a knowledge base of over 1,000 applications and superior emergency recovery. Get the power to help end the frustration of Windows 95 problems today!

Windows 95 - what a mess!

Every new program and peripheral adds new potential problems to your Windows 95 system. Software conflicts and hardware configuration errors can crash your PC in seconds. Botched installations or sloppy uninstalls can cause havoc and slow your system down. Most diagnostic utilities won't even catch many of these problems. They only analyze your hardware devices, or a limited number of applications.

But Fix-It can prevent software conflicts and configuration errors in hundreds of applications and hardware devices before they stop you!

Fix-It solves the problem

Fix-It starts with an automatic, comprehensive scan of your entire system – applications, the Windows 95 registry, configuration files, devices and drivers. It analyzes everything you're using against its extensive application knowledge base of over 1,000 Windows 95, 3.x and DOS applications. Then it fixes problems before they put you in a fix.

The *Preinstallation Inspector* finds potential conflicts in new applications before you install them. And, *Crash Defender* automatically intercepts crashes to give you the best chance to save your data.

See what a breakthrough Fix-It is today. To learn more, call the toll-free number below, visit your local retailer, or visit **www.quarterdeck.com** and download a **FREE TRIAL**.

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Call now and we'll rush you Fix-It for $29.95 plus shipping and handling. If you're not 100% satisfied, return it within 30 days for a full refund. Not valid with any other offer. Hurry, this is a limited time offer.

Call 1-800-225-8148 for volume licensing prices.

Offer Expires 9/30/97 Offer Code 01306

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Circle 189 on reader service card

Word Processing: Word Pro improves. The award for the most improved word processor goes to Word Pro 97. Overall, it was almost twice as fast as Word Pro 96, with the most notable improvements in application launching and document loading. By contrast, Word 97 was nearly 25 percent slower than Word 95. When all word processing applications were run on our Pentium MMX-200, performance increased across the board, from 38 percent for Word 95 to more than 70 percent for each of the other three word processors.

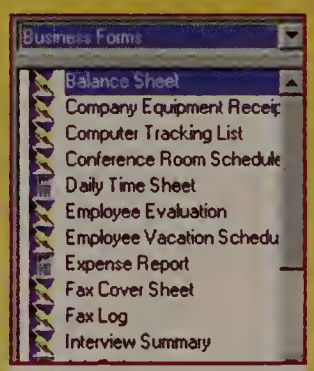
The upshot is that if you use Word Pro 96, you should consider upgrading to SmartSuite 97. You'll get a raft of new features, plus a performance boost. Microsoft Word users looking for a boost in performance won't find much in Word 97, so ▶

WordPerfect Suite Tightens Integration, Improves Web Features

WHEN COREL shipped WordPerfect Suite 7 last May, the vendor made an offer that many people couldn't refuse but may wish they had. Corel packed eight applications plus utilities, clip art, and fonts into a suite with the lowball price of $99. The problem was, many of the applications were poorly integrated, slow, and lacked collaboration tools. We examined a preproduction version of Corel's latest offering, WordPerfect Suite 8—and much has changed, for the better. The new suite is more tightly integrated and features improved Web publishing and new group editing tools. In informal tests, the new suite seems faster than its predecessor.

Different Ingredients

COREL JETTISONED Sidekick, Dashboard, and many other utilities found in WordPerfect Suite 7. Suite 8 offers a more thoughtful collection of complementary software. The suite still includes the latest versions of old standbys WordPerfect, Quattro Pro, and Presentations, plus Netscape Navigator 3.0 as well as fonts and clip art. Corel added Corel PhotoHouse, an image editing tool. CorelCentral, which combines calendaring, scheduling, to-do lists, and contact management, replaces InfoCentral, WordPerfect's powerful but complex personal information manager. CorelCentral was unavailable for preview and will not be shipping with the initial release of WordPerfect Suite 8 in June. Wordperfect Suite 8 costs more than Suite 7, with a $299 street price and competitive upgrade price of $149, although users will find a $20 rebate card in the box.



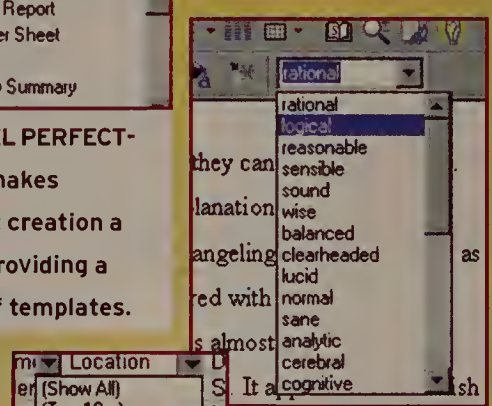
THE COREL PERFECT-EXPERT makes document creation a snap by providing a number of templates.

Application Integration

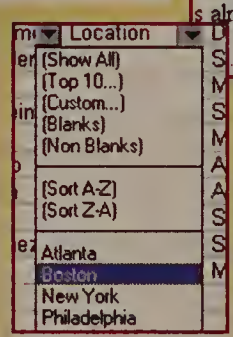
WORDPERFECT, Quattro Pro, and Presentations now share identical menu structures, similar dialog boxes, and an Application Bar that sits at the bottom of the screen. Much like the Windows 95 Taskbar, the Application Bar lets you switch easily between open documents as well as drag and drop data between them. PerfectExpert, WordPerfect's integrated help system, is also supported by each of the suite's major applications, a feature that still can't be found in Lotus SmartSuite.

WordPerfect Suite 8 includes group collaboration tools as well. The Version Controls feature, available in WordPerfect, Quattro Pro, and Presentations, lets you save multiple versions of a document in a single file. This makes it easy to switch between different versions of the document for review. But Corel's tools are not as powerful as those found in Lotus's SmartSuite.

The Internet publishing features have been improved in WordPerfect, Quattro Pro, and Presentations; they now include enhanced support for tables and frames. A new QuickLinks feature automatically converts Web addresses to hypertext links and also lets you embed links to other documents in your directories.



WORDPERFECT SUITE 8's Prompt-As-You-Go feature puts a thesaurus on screen at all times.



QUATTRO PRO'S QuickFilter command lets you quickly filter information from database tables.

On the application front, Corel has added some unique features to catch up with Lotus and Microsoft.

WordPerfect's Prompt-As-You-Go feature displays a list of alternative words from the Thesaurus as you type. New desktop publishing tools, such as multiple drawing layers, bring WordPerfect closer to Microsoft Word's capabilities. Quattro Pro includes a QuickFilter command, comparable to Excel's AutoFilter, that lets you quickly filter data from database tables. Presentations offers over 120 transition effects, plus a number of new backgrounds and predefined layouts.

A Definite Upgrade

OVERALL, WordPerfect Suite 8 is a significant improvement over its predecessor. If you haven't upgraded to a Windows 95 version of the WordPerfect Suite, now may be the time. If you moved to WordPerfect Suite 7 and were disappointed by the lack of integration and poor performance, Suite 8 offers a compelling reason to upgrade again. However, if WordPerfect 7 currently meets your needs, the $149 investment is probably not worthwhile.

—Cathy Kenny

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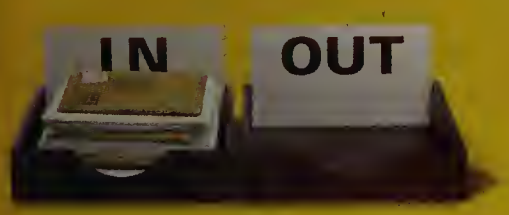

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Office Suites: Sluggish as Usual on Pentium-90

NEWER MAY NOT BE FASTER

SUITE	Word processor	Spreadsheet	Database	Presentation graphics	Total time	Overall score
Microsoft Office 95	:25	2:51	1:41	4:18	9:15	100
Lotus SmartSuite 97	:25	9:36	1:46	:49	12:36	90
Microsoft Office 97	:33	2:44	2:15	2:26	7:58	88
Lotus SmartSuite 96	:46	3:24	1:48	:55	6:53	85

Minutes 0 2 0 2 4 6 8 0 2 0 2 4

Application test times in minutes; lower numbers are better. Includes printing. For overall score, higher numbers are better.

WITHOUT PRINTING, VAST IMPROVEMENTS

SUITE	Word processor	Spreadsheet	Database	Presentation graphics	Total time	Overall score
Microsoft Office 95	:25	:23	1:06	:21	2:15	100
Lotus SmartSuite 97	:22	1:17	1:00	:19	2:58	86
Lotus SmartSuite 96	:40	:31	1:02	:22	2:35	78
Microsoft Office 97	:33	:42	1:44	:37	3:36	65

Minutes 0 1 0 1 0 1 0 1

Application test times in minutes; lower numbers are better. Does not includes printing. For overall score, higher numbers are better.

How We Test

HAND-TIMED TESTS were conducted on a Micron Millennia Pentium-90 with 16MB of RAM, 256K secondary cache, a 2.5GB hard disk, and a Diamond Stealth64 graphics controller with 2MB of RAM; and on an NEC Ready 9716 Pentium MMX-200 with 32MB of RAM, 256K secondary cache, a 3.2GB IDE hard disk, and an integrated graphics controller with 2MB of RAM. An overall score is a sum of the normalized and weighted time each suite's applications took to complete their respective tasks: word processing (40 percent), spreadsheet (30 percent), database (15 percent), and presentation graphics (15 percent). The best-performing suite is assigned an overall score of 100.

Word processing: We launched the application, and performed various tasks, such as loading a 40-page native document, importing a file, inserting a graphic, performing a search and replace, linking a spreadsheet, and printing.

Spreadsheet: We launched the application, opened a 27-column-by-8192-row spreadsheet, changed a cell value, recalculated, created a chart, saved the workbook, and printed it.

Database: We launched the application, opened a 45,000-record table, filtered the table for a 24,000-record subset, performed a linked query, generated a report, and printed it.

Presentation graphics: We launched the application, loaded a 45-slide presentation, imported graphics, imported a linked spreadsheet, saved the presentation, and printed it.

Data based on tests performed by the PC World Test Center. All rights reserved.

the upgrade decision will depend on other factors.

Spreadsheets: SmartSuite moves backwards. 1-2-3 97 was the big loser in our spreadsheet tests—its abysmal performance was the main reason that SmartSuite 97 didn't take first place. In five out of six tests, 1-2-3 release 97 was slower than its 16-bit predecessor, 1-2-3 release 5.01, when running on the P-90. The recalculation test was the only one in which 1-2-3 release 97 equaled the speed of its predecessor, or of Excel 95 and Excel 97 for that matter.

Other spreadsheet tasks such as creating a chart and saving the worksheet saw a decrease in performance from 1-2-3 release 5.01 to 1-2-3 release 97. Creating a chart in 1-2-3 release 5.01 took just 2 seconds, but generating that same chart in 1-2-3 release 97 took over 30 seconds. However, we saw significant improvement when running the same test on the Pentium MMX-200.

1-2-3 release 97's biggest problem, however, was in printing. It took more than 8 minutes to print our sample worksheet. In contrast, release 5.01 only took a little under 3 minutes to print the same worksheet. There was considerable improvement on the Pentium MMX-200: 1-2-3 release 97 completed the printing tasks in just under 3 minutes, and 1-2-3 release 5.01 finished in about 1 minute and 15 seconds. Lotus attributes the spreadsheet's poor performance to the fact that 1-2-3 release 97 uses Windows 95 printer drivers rather than relying on its own optimized printer drivers, as it had done in the past. Lotus said it plans to address the printing problem, possibly with a patch or download, later this year. If you plan to upgrade to 1-2-3 release 97 for its impressive set of new features and you print a lot of large, complicated spreadsheets, you'll want to consider upgrading your hardware.

Excel 97 was slightly faster than Excel 95 overall. Excel 97's printing was 20 percent faster on a Pentium-90 than Excel 95—but the fact that it took a little over 2 minutes to complete the printing test is something to consider if you print a lot of worksheets. On the P-90, Excel 95 was more than twice as fast as Excel 97 in opening the test worksheet, and tasks such as creating a chart and saving a worksheet file were also faster in Excel 95.

On the Pentium MMX-200 system, both versions of Excel improved considerably. Excel 95 on a Pentium MMX-200 ran over two and a half times as fast as it did on the P-90, while Excel 97 nearly tripled its speed on the faster system. Although Excel 97 fared much better than 1-2-3 release 97 in printing, these results show that both programs leave a lot to be desired in the printing department. If you want ▶

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Databases: More bad news. The newest Windows 95 databases were unimpressive in our tests. Access 97 was the big loser, performing about 25 percent slower than Access 95 on our Pentium-90. Access 95, and Approach 96 and 97, all scored about the same. Approach did especially well in a key database task, finding and filtering records. In a test that required the databases to find 24,000 records in a 45,000-record table, Access 97 took 33 seconds, more than twice as long as either version of Approach. Access 95 completed the task in 24 seconds, which was still slower than either version of Approach.

The differences between Approach 95 and Approach 97 are negligible, on both the Pentium-90 and Pentium MMX-200 with more RAM. But we did find that, as with Access, you can gain a performance boost in both versions of Approach by upgrading to a Pentium MMX machine. This upgrade will improve performance by one and a half times for both Approach 96 and Approach 97.

Access 95 was faster than Access 97 in all but two tests on the Pentium 90. On our Pentium MMX-200 system, Access 97 ran 20 percent faster than Access 95 in overall performance. The upshot? If you're unhappy with your current Windows 95 database, don't look to a suite upgrade for a performance boost. If you need the power and new features of Access 97 and you plan to manipulate huge databases, make sure you've got the hardware to support it.

The **best reason** to upgrade your software suite is to **get hold of slick new features.**

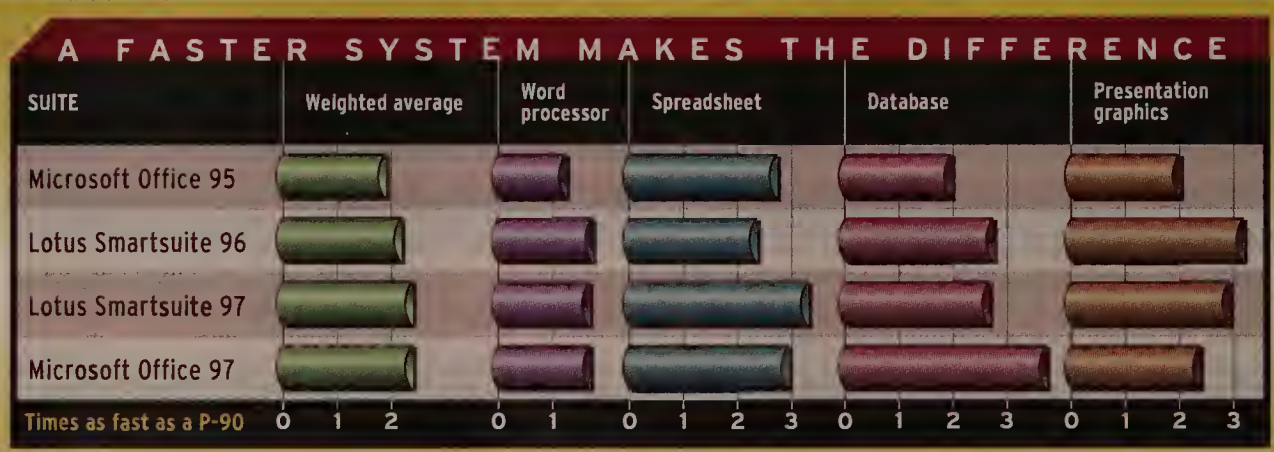
Presentation Graphics: Lotus wins one. Lotus's Freelance has long been a leading presentation graphics program due to ease of use. It has now proved itself worthy on yet another front: performance. Overall, Freelance 96 was more than four and a half times as fast as Microsoft's PowerPoint 95, and Freelance 97 was over three times as fast as PowerPoint 97. The main problem with PowerPoint was printing, lagging behind both versions of Freelance.

Freelance 96 and Freelance 97 performed almost identically on the various tests.

But there's some good news for PowerPoint users. PowerPoint 97 cut printing time in half, taking a little less than 2 minutes to print our 45-slide sample presentation compared to close to 4 minutes in PowerPoint 95. (Freelance printed our sample presentation in about 30 seconds.) On the Pentium MMX-200, printing speed doubled in PowerPoint 95 and nearly tripled in PowerPoint 97.

When we ignored the printing tests, PowerPoint 95 pulled about even with both versions of Freelance. But PowerPoint 97 then fell behind the pack.

Freelance 96 users seeking additional performance boosts should upgrade their hardware. Moving to Freelance 97 adds features but doesn't improve performance. On the other hand, PowerPoint 95 users looking for faster printing would do well to upgrade their software.



THE SUITES WERE ponderously slow on our Pentium-90. But when we retested with a Pentium MMX-200 with 32MB of RAM, performance surged. Scale shows performance in times as fast as tests on a Pentium-90.

THE WINNER: NONE OF THE ABOVE

A HARDWARE upgrade is your best bet if you're looking for better overall performance from your software suite. But if you've got a particular application that's dogging you, upgrading your software is an option in specific cases—just be aware of the trade-offs.

For example, although Word Pro 97 is faster than its predecessor, 1-2-3 release 97 is a disappointment, particularly if you regularly need to print large and complex spreadsheets. And Office 95 users looking for better performance are out of luck. Compared to their Office 95 predecessors, PowerPoint 97 can print faster, Excel 97 is only slightly quicker, and Word 97 and Access 97 are dramatically slower.

The best reason to upgrade your software is to get hold of slick new features. If you pair the latest software suites with the latest hardware, you'll have the best of both worlds—features and performance.

—*Cathy Kenny* ▶

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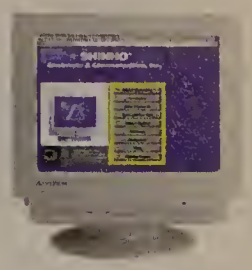

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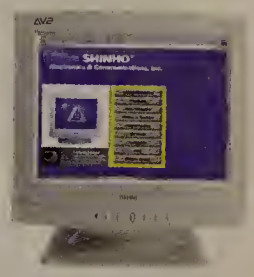

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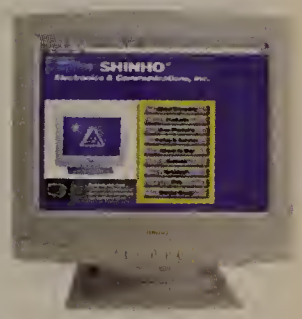
15"/13.75 viewable
0.28mm dot pitch



AV2 785F
17"/15.8 viewable
0.28mm dot pitch
AV2 765F
17"/15.8 viewable
0.26mm dot pitch

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Circle 207 on reader service card

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Free E-Mail: A Viable Option for Careful Consumers

UPDATE

FREE E-MAIL has transcended novelty status: Three free e-mail services are celebrating one-year anniversaries, and two of them claim more than a million customers. But as with any free offer, it pays to think carefully about what you're getting into: Already, one service has gone out of business, and industry watchers caution that others may follow.

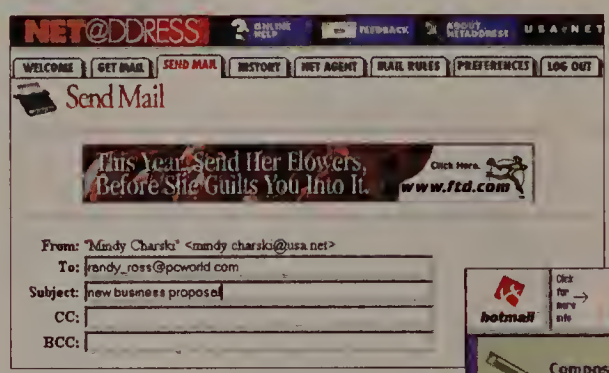
Free is a relative term. Only one of the large established services, Juno Online Services, is actually free. You can send and retrieve e-mail using the vendor's software and a local phone number. Two of the others, HotMail and NetAddress, are Web based, which means you'll need Internet access to use them.

THE OFFERS

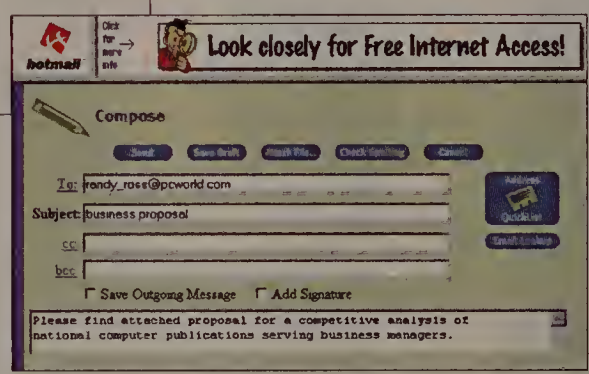
SEMANTICS ASIDE, free e-mail can still save you money. Internet service providers often limit the number of mailboxes available in their basic services. So instead of paying to upgrade your ISP account just for e-mail, you can add free e-mail accounts for additional users at no cost.

Free e-mail accounts let you change service providers as often as you want in search of the lowest price. Even when you change providers, your e-mail address stays the same, and as long as you have access to the Internet you won't miss any important messages.

When picking a free e-mail service, look at the number of users it has, how long it's been up, and how easy it is to use. Also note key features such as support for phone books and attachments, and the ability to store e-mail in folders. HotMail, NetAddress, and Juno offer many of these features. In addition, they've been around for at least a year and boast a large number of members.



CLEAN AND SIMPLE: NetAddress offers a simple interface ideal for less-experienced PC users.



MORE MUSCLE: HotMail offers more features, including the ability to send attachments.

HotMail says that about 3 million users have registered for its service since it was launched last summer. HotMail provides free access to 15 news offerings, including the financial services Quote.com and Closing Bell. You have the option of including a "signature" in messages, which lets you add your phone and fax numbers to outgoing mail. You can also spell-check your mail. To send attachments, you'll need Netscape Navigator 2.0 or higher. HotMail limits you to 2MB of space on their server, which could become cramped if you typically hold messages for long periods of time or need to receive large file attachments. (For more on HotMail, see "Hot Picks for the Home Office," in this issue.)

NetAddress is ideal for less-experienced PC users. It started in April 1996 as a fee-based service but became free last December; it now has about 700,000 subscribers. The interface uses a simple and easy-to-navigate filing-cabinet metaphor. Simplicity has its trade-offs, however; while you can read attachments, you currently cannot send them, and there's no spelling checker. Both features will be available soon, according to USA.Net. NetAddress provides you with 3MB of space on its server.

Since Juno is not a Web-based program, you don't need to pay for ISP service—all you need is a modem and a phone jack. Juno claims to have 2.2 million users. The year-old company says about 95 percent of its members can dial in to one of its 400 local numbers for no charge. The program is about 1.2MB, so it could take about 5 to 10 minutes to download on a 28.8-kilobits-per-second modem. It was easy to install and includes some niceties, such as a spelling checker. On the downside, the service does not support attachments.

THE CATCH

BEFORE TRUSTING your e-mail to one of these services, consider the drawbacks. Because these services are supported by advertising, your messages are accompanied by distracting banner ads that often flash wildly on your screen. HotMail was the most annoying because it adds a one-line advertisement for its service at the end of your outgoing mail. NetAddress will soon put ads into your incoming messages.

To register for the services, you have to answer 10 to 20 questions about your age, income, hobbies, and so forth, so advertisers can target you with their products. (But each service says it will not sell personal information about you to advertisers directly.)

Finally, selling ads online is a competitive and uncertain business. To increase your odds of having a service that will be around for a while, select one that's larger and more established; however, there are no guarantees. Then again, you can't beat the price.

—*Mindy Charski* ■

HotMail
HotMail
888/932-6245, www.hotmail.com

NetAddress
USA.Net
800/592-1240, www.netaddress.com

Juno Online Services
D.E. Shaw & Co.
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Circle 12 on reader service card

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NEW PRODUCTS

SoftRAM 3.0: Another Software Accelerator To Avoid

UTILITY

LIKE A LATE-night infomercial, Syncronys Softcorp's **SoftRAM3** makes tantalizing promises: The box describes the $30 product as a "powerful three in one performance suite" that will "maximize your memory, accelerate your CD [and] boost your system."

SoftRAM tries to improve PC performance through software-driven dynamic RAM compression and caching. Previous memory products that attempted to increase performance without adding physical RAM have been disappointing, as was the shipping copy of SoftRAM3 for Windows 95 and 3.1 we tested.

At first, we experienced frequent crashes on two Dell Windows 95 machines with 16MB of RAM (a Pentium-133 and a Pentium-75), as well as on a Windows 3.1 Toshiba DX4-75 notebook PC with 12MB of RAM. This problem was unexpected, because the SoftRAM box recommends a PC with at least 8MB of RAM. Our testing revealed a software bug, and consequently Syncronys posted new versions of the program on its Web site. (It's downloadable if you've purchased SoftRAM3.) Fixed versions should be in stores by June, says Syncronys.

However, SoftRAM3 provided almost no change in Windows 95 system performance. On the Dell P-133 test system with 16MB of RAM, we found no real improvement in performance, as measured by PC WorldBench tests. Nor did we see any meaningful speed increase in the timed tests of common tasks like launching an application or opening a file. The PC's performance with and without SoftRAM loaded was almost identical. When we first discovered the bug, Syncronys had suggested increasing the RAM to at least 32MB as a fix. To play it safe, we upgraded the Dell P-75 test machine to 48MB of RAM. Performance testing on this system showed similarly unimpressive results.

Syncronys does not say that Windows 95 users will be able to load more applications if SoftRAM3 is installed. But the company does make that claim for Windows 3.1 users. A note near this claim on the package reads: "Results may vary based on your system and applications." In our Windows 3.1 tests on the Toshiba Satellite T2155CDS notebook with 12MB of RAM, we were not able to open any more applications with SoftRAM installed than without it.

NEW VERSION, OLD PROBLEMS

SYNCRONYS made news in *PC World* and elsewhere in 1996 when tests of the previous release of SoftRAM, called SoftRAM95, showed no significant change in PC performance. The Federal Trade Commission pursued Syncronys for making false advertising claims. In July 1996, Syncronys settled with the FTC but admitted no wrongdoing. The company also took SoftRAM95 off the market.

How does SoftRAM3 work? It attempts to optimize RAM through compression and buffering. As Windows swaps memory pages out of RAM to make room for other programs or data, SoftRAM captures, compresses, and holds selected pages in a part of

BRAINY IT'S NOT: SoftRAM's Brain Central panel looks fancy, but the program isn't very effective.

PHOTOGRAPH: KEN SMITH

SoftRAM3

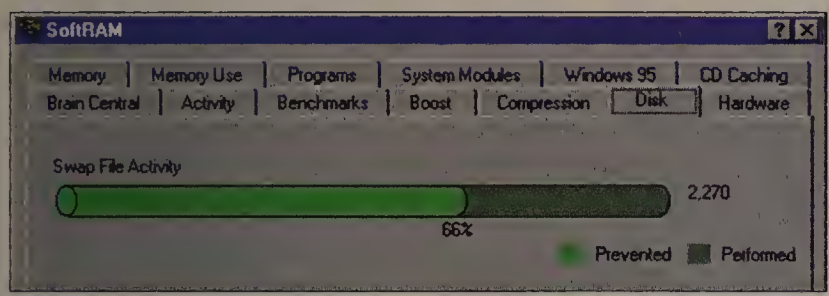
PRO: None identified, although enhanced CD-ROM performance is possible.

CON: Did not improve overall system performance.

VALUE: Not recommended.

Syncronys Softcorp
888/777-5600
www.syncronys.com
Street price: $30

READER SERVICE NO. 753



SWAP TALK: SoftRAM's disk compression doesn't do much.

memory it sets aside for itself. The goal is to improve performance by reducing the number of times the pages swap in and out of RAM.

The lack of results shown in our tests of SoftRAM with both Dell PCs follows the pattern of other memory enhancement products we've tested (see "Software Speed-Ups: Bold Claims and Dubious Promises," April).

Installation also may not be smooth. If you have a Windows 95 machine that has been upgraded from Windows 3.1 or has any 16-bit drivers, SoftRAM may cause problems requiring technical support.

THE BOTTOM LINE

SOFTRAM'S promotional materials also promise that the product will enhance a CD-ROM drive's performance through an adjustable cache. We did not have time to test this feature after the corrected version 3.0 arrived, but similar products have provided only modest performance benefits.

Finally, the box says SoftRAM will "boost your system": This refers to optimizing some system settings stored in the Windows 95 Registry and in the system.ini and win.ini files. These boosts aren't available if you use Windows 3.1.

If you are using Windows 95, SoftRAM shows original and optimal setting for various parameters, and you can click a Boost button to optimize each setting. But when we viewed the settings on our P-133 and P-75 test PCs, most were listed as "already optimized," with the Boost button grayed out and unavailable.

The Brain Central feature offers data on disk activity and the like—data already found in most utility programs.

Based on our experience, you won't like the show that SoftRAM3 puts on. Your best bet is to pass.

—Dean Andrews

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World's Smallest Notebook: Toshiba Libretto

NOTEBOOK

IT'S NOT A souped-up PDA. And it's not simply a thin notebook. We're not sure exactly what to call the **Toshiba Libretto**. This $2000 "mini-notebook" weighs less than 2 pounds but packs a Pentium-75 processor, a 760MB hard drive, 16MB of EDO RAM, and the full version of Windows 95, so it can run everyday business applications. A preproduction version looked promising but wasn't ready for testing at press time.

The Libretto is only about 1.3 inches thick and is shaped and sized like a very thin brick. It takes up hardly any room in a briefcase. It has a small but exceptionally bright 6.1-inch active-matrix color screen. Its 80-key keyboard is smaller than an average notebook's; it should be fine for working on memos and spreadsheets, though not for writing a novel. A trackball sits to the right of the screen, with the buttons on the back of the display. Although this sounds rather strange, it's not difficult to use.

A PC Card slot can accommodate an optional modem or external floppy drive (expected to sell for about $100). A port replicator costs about $200.

For the price, you'd obviously get more speed and included features in an 8-pound notebook. But if you need to run basic business apps on a much lighter machine, the Libretto could be a good travel companion.

—Eric Hellweg ▶

IT'S MUSIC TO THE EARS OF FREQUENT TRAVELERS: Toshiba's Libretto gives you a Pentium-75 processor, 16MB of RAM, and a 760MB hard drive in less than 2 pounds.

Toshiba Libretto

PRO: Lightest notebook PC we've ever seen.

CON: A basic machine; small keyboard is appropriate only for short documents.

VALUE: Promising if light weight is most important to you.

Toshiba Computers Systems Division
800/334-3445
computers.toshiba.com
Street price: $2000

READER SERVICE NO. 754

EDITED BY
Yardena Arar and Laurianne McLaughlin

Epson and Alps Personal Printers: Best Photo Quality Yet

PRINTERS

MOST PERSONAL color printers can't produce pictures that look remotely like the snapshots processed by your local one-hour photofinisher. But two printers set a new standard in the category. Epson's **Stylus Photo** and Alps's **MD-2300 Masterpiece** really do justice to photos and can handle business-quality text documents, too. They're a different breed from such photo printers as Panasonic's TruPhoto, which prints *only* photos on small, specially treated paper.

The biggest catch is that Epson's and Alps's new units are expensive compared with typical ink jets like the $299 Epson Stylus Color 600, the top model on *PC World*'s June Top 10 Personal Printers chart.

The $499 Stylus Photo looks and works a lot like Epson's other ink jets but uses six ink colors rather than the usual four. This makes a huge difference with photos: Skin tones are much more faithful, fabrics retain their textures, and small details don't get lost in dithered dot patterns.

Is the Stylus Photo's print quality truly photo-realistic? If you squint, you may see very tiny dots in the printed photos, but the images look far better than most magazines'. The output is best if you invest in Epson's glossy paper, which costs more than a dollar per sheet. Pictures printed on this paper will look nearly as good as the "real" photographs hanging on walls in your home. The Stylus Photo also works reasonably well with plain paper, although its black text could be crisper.

At $749, Alps's MD-2300 Masterpiece costs $250 more than the Epson, and the print quality on Alps's special photo paper (also costing a little over a dollar a sheet) is only marginally better. The Masterpiece, which uses Alps's Micro Dry technology, prints more slowly than the Stylus; it took more than 9 minutes to complete a 4-by-6-inch image that the Epson printed in 6.5 minutes.

On the plus side, the Alps's paper feels thicker and sturdier than the Epson's—more like real photo paper. Also, the Masterpiece's black text on plain paper equals laser output in sharpness. According to Alps, the Masterpiece's output is lightfast (whereas prints from ink jets such as the Stylus Photo may fade over time).

As admirable as the Alps's print quality is, the unit does have some minor design flaws. Unlike the Epson, it uses special ink cartridges for its photographic mode; you must open it up to swap them in and out. And the Alps's noisy fan stays running much of the time, even when it isn't printing.

Both of the printers come with good photo-editing software: Epson includes LivePix, and Alps bundles Adobe PhotoDeluxe.

Overall, we'd recommend the Epson Stylus Photo as a better value. It's not cheap, but it's worth the price for families who want to print high-quality photos, for digital photography enthusiasts, and for small-business owners, such as real estate agents, and others who use marketing materials packed with photos.

—*Harry McCracken* ▶

EPSON'S STYLUS PHOTO WINS: Great quality, low price.

ALPS MD-2300 MASTERPIECE: Smoother images, but at a cost.

PRETTY PICTURE: Alps's MD-2300 Masterpiece delivers crisp color photos and sharp text.

Epson Stylus Photo

PRO: Virtually photographic print quality.

CON: Costlier than most ink jets.

VALUE: Excellent if you need top-quality photo output.

Epson America, Inc.
800/463-7766
www.epson.com
Street price: $499

Alps MD-2300 Masterpiece

PRO: Virtually photographic print quality and laserlike text.

CON Very expensive, requires frequent swapping of ink cartridges.

VALUE: A fine printer, but the Epson is a better deal.

Alps Electric (USA), Inc.
408/432-6000
Street price: $749

READER SERVICE NO. 755

QUICK TAKES

Quick 3-D Graphics

With Font F/X you can quickly produce nifty 3-D logos for use in presentations, Web pages, and other documents. This software has a straightforward interface, a well-designed wizard, and plenty of templates, so creating 3-D type effects doesn't require much more effort than typing in the text and selecting a predesigned look. If you feel more ambitious, you can easily customize the color, texture, and lighting of your logos, although the results sometimes look a little jagged because Font F/X doesn't use antialiasing to smooth edges. At $79, this program is a bit pricey, considering that more versatile 3-D graphics packages like Micrografx's Simply 3D also sell for less than $100. DCSI; 303/447-9251; www.dcsifx.com

READER SERVICE NO. 756

—*Harry McCracken*

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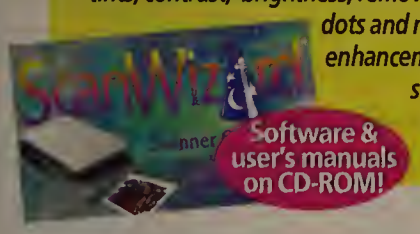
Windows or Mac models: Visioneer® PaperPort document management software. Drag-n-drop scans to OCR, fax, e-mail or printer software

visioneer
PAPERPORT.

For Windows or Macintosh models: Caere's OmniPage Limited Edition OCR software for scanning and converting pages of text into digital files that can be edited

For Windows or Macintosh models: Microtek's award-winning ScanWizard™ scanner controller "...arguably the best in the business..." according to PC Magazine (3/4/97). Adjust color tints, contrast, brightness, remove halftone dots and more. See enhancements on screen before the final scan.



Drive It With The Top Down or Up & Enjoy The Scenery. Microtek's new and incredibly fast *ScanMaker® V300* color scanner is a sporty little model that's small enough to park on your crowded desktop, yet powerful enough to scan and place virtually any color image or document directly into your computer. Capture breathtaking color photos, documents, even 3-dimensional objects in seconds. And it's full-loaded with software at an amazingly low sticker price.

New Technology from Microtek Engineering. The ScanMaker V300 features many new advances in scanning technology including the *FlexScan™ Lid*, a unique hinge design that allows the V300's lid to remain flat even when scanning books and other 3-dimensional objects; stay upright to align documents on the scan bed; or quickly detach for scanning oversized documents. A *Parallel Port Cable* is included for Windows models for quick-and-easy / plug-n-play installation, so there's no need to pry open your PC to install an interface card. And with *Microtek's Zero Reflection Design Technology™* you get denser, sharper color through optic and hardware design that minimizes light "bounceback" whenever you scan.

Want More? For the Microtek reseller nearest you or more information about the new ScanMaker V300, call Microtek Sales at **1-800-654-4160**. For information about scanning or Microtek's other great products, dial our AutoTech fax back system at **310-297-5101** or point your Web browser to our award-winning Web site: **www.microtekusa.com**.

MICROTEK
ScanMaker V300

Available in Windows or Macintosh models

Works with Windows® 3.1x, 95 & NT!

Mac™OS

- *24-bit color depth*
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- *4800 x 4800 dpi enhanced*

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Price mentioned is U.S. suggested street price. Bundled software and user's manuals are on ScanMaker V300 CD-ROM. Retail packaging of software depicted is not available. The following are trademarks or registered trademarks of their respective companies: Microtek, ScanMaker, Zero Reflection Design Technology, Flex-Scan Lid, and ScanWizard of Microtek Lab, Inc.; Windows of Microsoft Corporation; Macintosh of Apple Computer, Inc. OmniPage Limited Edition of Caere Corporation (1-800-535-7226); PaperPort of Visioneer, Inc.; Color It! of MicroFrontier, Inc.; iPhoto Express of Ulead Systems, Inc. All other trademarks or registered trademarks are the property of their respective holders. Prices, specifications and software bundles are subject to change without notice. V300PCW597

Hi-Val DVD Kit: Send Movies Wirelessly To Your Television

MULTIMEDIA

AFTER MORE THAN a year of hype, the first Digital Versatile Disc products are trickling into stores and tempting multimedia enthusiasts. This new medium allows video and audio quality that far surpasses that of today's CD-ROMs. The 4.7GB discs will be used for everything from interactive multimedia games and titles to full-length films. You won't find many movies yet—only a handful of DVD titles are currently on sale, and only in selected major cities. Most titles should ship late this year.

If you want to jump into DVD now, a key question arises: Do you buy a DVD player to use with your TV for movies, or a DVD-ROM drive to play games on your PC? There will be different ways to connect your computer and TV and to share DVD devices, but Hi-Val has one of the first—a kit called the **Hi-Val Home Entertainment System**. It will sell for $849, about the cost of a high-end DVD player, and offers a unique approach.

NOVEL BUT IMPERFECT: Hi-Val's Home Entertainment System lets a PC and TV share a DVD-ROM drive, but it needs work.

The kit bundles a Toshiba DVD-ROM drive with a Cinemaster card that installs in your PC, with a wireless radio transmitter-receiver box for your television. You can use the drive with your PC and its monitor, just as you use a CD-ROM drive today. But when you want to watch a movie, the DVD Remote software can deliver the show to any TV set in your home—without wires. It's a smart idea: You pop the disc in your PC's drive but watch the movie on your big-screen TV.

NICE RESULTS, MESSY SETUP

IF THIS SOUNDS rather complicated, it is. Setting up the Hi-Val is a time-consuming adventure that involves hooking up the internal DVD-ROM drive; installing the Cinemaster card, its drivers, and DVD Remote software; making the right connections between the Cinemaster, sound card, and radio transmitter; and then connecting the receiver to your TV or VCR.

The preproduction kit I tried out worked okay, but not on my home PC—a Pentium-133 of late-1995 vintage that lacked an Intel PCI chip set with bus-mastering capability. Most newer PCs have this chip set, which is listed clearly in the Hi-Val's system requirements. Make sure your PC has it too, before trying to install the kit.

REMOTE CONTROL CRAVINGS

I HAD SERIOUS reservations about the Hi-Val kit's limitations as a DVD movie player. Your TV set doesn't have to be near the PC—the wireless transmission range is 300 feet, and it works even through walls. But the transmission works only from the computer to the TV, not vice versa. So even the simplest task must be performed from the PC. If your television isn't close by, even pausing a film will be inconvenient. According to the vendor, future editions of the kit will come with a remote control device.

Hi-Val plans to ship the systems with a half dozen DVD discs. The one movie included is *Muppets Treasure Island;* the five games and multimedia titles are The Daedalus Encounter, Spycraft, Wing Commander IV, Silent Steel, and Encyclopedia Electronica. None of these discs are must-haves. There aren't many DVD titles available right now that vendors can choose from for bundling. That should change by this fall.

Hi-Val's Home Entertainment System offers appealing flexibility, but be aware of its ease-of-use drawbacks. Based on my experience, you may enjoy DVD more if you wait for an improved version of this product.

—*Yardena Arar* ▶

Hi-Val Home Entertainment System

PRO: DVD for PC and television in one reasonably priced package.

CON: Complicated setup, no control at TV end.

VALUE: A flexible product, but consider waiting for the next version.

Hi-Val
888/383-4482
www.hival.com
Street price: $849

READER SERVICE NO. 757

QUICK TAKES

Double-Duty Notebook Modem

When you're on the road and trying to get online, few things are more irritating than discovering that a normal-looking phone line is digital—a common situation in large corporate facilities—and that your standard analog PC Card modem won't work with it. You could travel with a separate digital modem, but with Ositech's $210 Trumpcard Five of Diamonds you don't have to bother. It works both ways. The only extra baggage is a supplied connector that fits into the handset of the digital phone. You have to dial a digital phone manually, and you may need to use the supplied software to adjust settings—a small price to pay for the convenience. An $85 optional kit is available for cellular connections. Ositech Communications, 888/674-8324, www.ositech.com

READER SERVICE NO. 758

—*Yardena Arar*

Introducing the TravelMate® 7000

Single 7-hour battery

166MHz Intel® Pentium® processor with MMX™ technology

32MB RAM

2.0GB/3.0GB hard drive

12.1" active matrix screen

10X CD-ROM

33.6 Kbs internal fax/modem

DockMate III (optional)

7.5 lbs.

Windows® 95 or Windows® NT

Wireless LAN ready

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VeriTest Battery Life Results in Hours***

TravelMate 7000 (166MHz MMX)	7:26
IBM ThinkPad 760ED (133MHz)	2:38
Toshiba Tecra 720 CDT (133MHz)	2:38
Dell Latitude XPi (150MHz)	4:15
HP Omnibook 5500 CS (120MHz)	2:35

MMX™ intel inside pentium® PROCESSOR

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*7-hour battery life based on VeriTest Cross Country test March 1997 running Windows 95. ***Full results available at www.veritest.com/tm7000xc.htm

Creative WebCam: Desktop Video for $170

VIDEO CAMERA

CREATIVE LABS' **Video Blaster WebCam** gives you easy personal desktop video for a street price of only $170. The WebCam, one of the least expensive digital color video cameras to date, comes bundled with software for Internet video phone calls, personalized e-mail greetings, and more.

Its main competitor is Connectix's Color QuickCam, which has similar software but costs $59 more.

A CAMERA THAT MAKES YOU SMILE: No elbow grease is required to set up Creative Labs' Video Blaster WebCam. Attach a cable to the PC's parallel port, and you're all set.

Video Blaster WebCam

PRO: Bargain price, easy to install, big bundle of useful software.

CON: As with similar products, images are somewhat jerky.

VALUE: Great for video telephony, e-mail, and Web page clips.

Creative Labs
800/998-5227
www.creativelabs.com
Street price: $170

READER SERVICE NO. 759

Based on my experience with a prerelease unit, the charcoal-colored, golf ball–size WebCam is wonderfully easy to install. You don't need to unscrew the case of your system—the WebCam's cable connects to the parallel port of your PC. The camera unit sits on top of your monitor, and the power adapter plugs into a standard or PS/2 keyboard outlet (the keyboard cable then connects to the adapter). The only downside: You'll have to buy a pass-through switch if you want to hook up another device to the parallel port, such as a printer or scanner.

The WebCam's useful software bundle includes Ulead MediaStudio 2.5 Video Edition for creating video files; Creative Labs' own Video WebPhone for videoconferencing and making phone calls on the Internet; AltaVista's Howdy, which allows you to create self-extracting multimedia messages for e-mail or Web pages; and Charlotte Internet Stuff's I Spy, which automatically sends periodically updated live pictures to a Web page. The WebCam kit also comes with a microphone.

It took me no more than a half hour to set up the WebCam, install the software, and see myself in 10 frames per second in a small video window on my monitor. At that speed the video looked jerky, but the color wasn't bad, and the overall quality compared favorably to that produced by slightly more expensive digital video cameras.

The WebCam isn't a product to buy for top-quality videoconferencing or video captures. It's intended for home and small office applications.

If you've wanted to dabble in Internet video but were discouraged by the cost, check out the WebCam.

—Yardena Arar

Quick View Plus: No Bargain Bundle

UTILITIES

WHEN ISN'T A bundle a bargain? When for $9 more you can buy a much better combination of tools. Such is the case with PKWare's bundle of **PKZip for Windows** with Inso's **Quick View Plus**.

At first glance, this seems to be a great deal. Quick View Plus—which lets you view, print, and copy from most file types—is one of the best file-handling tools around. And in this age of the Internet, everyone needs a .zip-based file compression program to help keep those uploads and downloads moving. (PKWare introduced the .zip standard back in 1986.)

Sold individually, Quick View Plus costs $59 and PKZip is priced at $49, meaning that the $79 bundle will save you $29.

The problem is that PKZip just isn't worth anything close to $49. Compare it, for example, to Nico Mak's $29 WinZip, a fine compression program that knows every trick in the book and integrates nicely into Windows 95. With WinZip installed, right-clicking a file name gives you an option to compress the file. Not so with PKZip. And once it's installed, Quick View Plus also becomes a right-click option with any file.

Quick View Plus even allows you to view and decompress .zip files, freeing you of the need to buy a compression program as long as you receive .zip files but never create them yourself.

This is a bundle in the crudest sense of the word: one box with two books, two sets of floppy disks, two installation routines, and two user interfaces. Quick View Plus sold separately is a good deal; this bundle is not.

—Lincoln Spector ▶

PKZip 2.5 for Windows With Quick View Plus 4.0

PRO: Quick View Plus is handy for peeking at files.

CON: PKZip has a clunky interface.

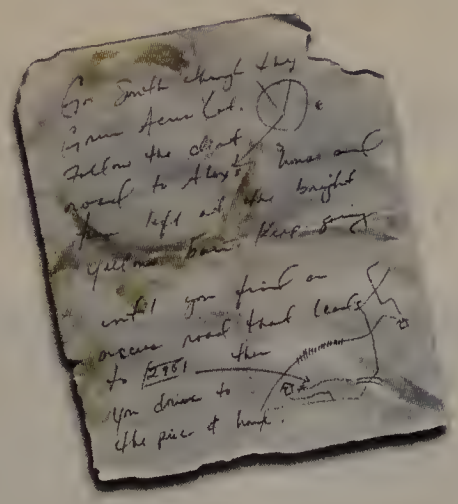
VALUE: Pass on the bundle; buy Quick View Plus and another compression program.

PKWare
414/354-8699
www.pkware.com
List price: $79

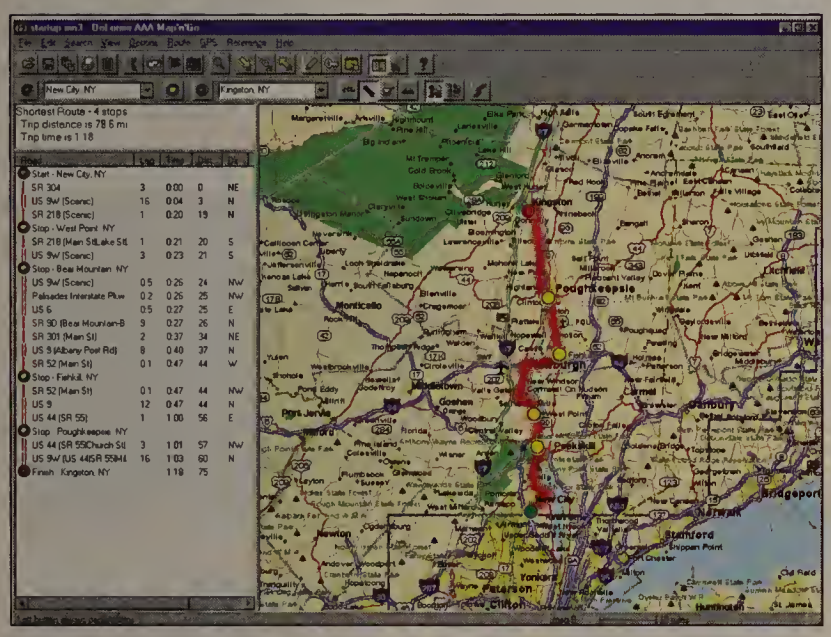
READER SERVICE NO. 760

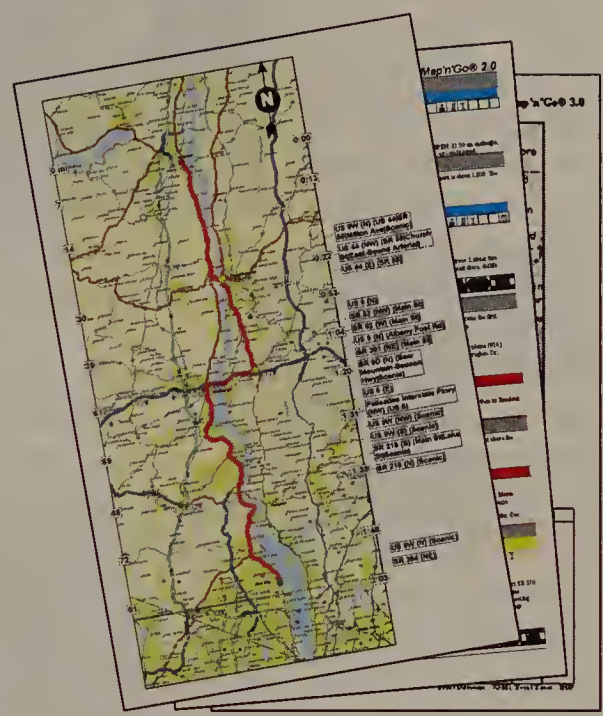
Some people just give you directions…

New Version 3.0 May 1997



AAA Map'n'Go gives you a travel plan.





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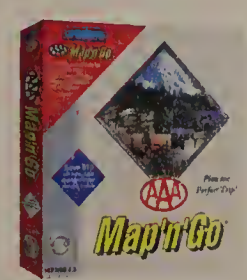


CD-ROM for Windows® 3.1 and Windows 95 *requires GPS receiver

1-800-795-3951 www.delorme.com

Circle 37 on reader service card

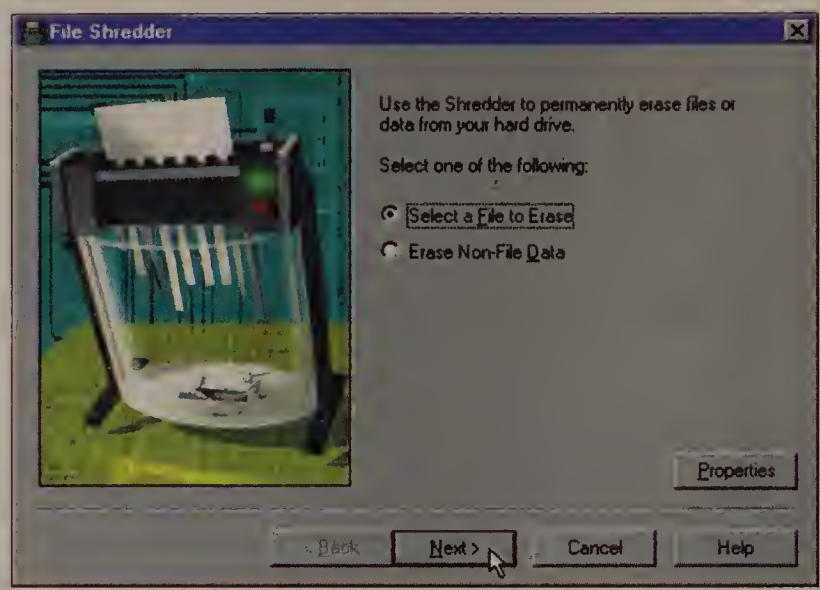
Nuts & Bolts: More Utilities Than Norton for Less Money

UTILITIES

HELIX SOFTWARE'S **Nuts & Bolts** utilities package is so comprehensive that it could have been called "Kitchen Sink." This $50 collection of programs takes on the established category leader, Symantec's Norton Utilities, and gives you more utilities for a lot less money. To come close to the features that Nuts & Bolts offers, you'd need to buy three Symantec packages: Norton Utilities ($125), For Your Eyes Only ($85), and Healthy PC ($30).

The Nuts & Bolts CD-ROM comes with separate 32- and 16-bit versions for Windows 95 and 3.*x*. The 16-bit version does not include some advanced utilities—the Registry editor, for example—that apply only to Windows 95. (I used the Win 95 version in prerelease form.)

If you're using Windows 95 and are comfortable with its nooks and crannies, Nuts & Bolts offers a wealth of useful tools. The only drawback is that it's not a good choice for PC novices. The package is highly customizable, and it makes extensive use of wizards to lead you through complex procedures. But its default configuration installs and activates all features and makes many changes to your PC's setup. The program can be intimidating, too, and it's possible to get yourself into trouble with some of the advanced features, such as those that access Windows 95's Registry.



HARD DISK HEAVEN: Nuts & Bolts cleans up old and duplicate files and erases all traces of deleted files from your disk.

The utilities fall into four general categories: hard disk cleanup and optimization, system file and configuration repair, security and management, and error prevention and crash recovery.

Besides the hard disk analysis and optimization features you'd expect, Nuts & Bolts has wizards that clean up old, duplicate, and unused files; fix Shortcuts; and maintain and repair the Windows 95 Registry. It creates a single "rescue" floppy disk (by contrast, Norton usually requires several floppies for this purpose).

The Registry Wizard, despite its potential for trouble in inexperienced hands, was useful. An overall tune-up removed unnecessary data and found and repaired corrupted Registry entries.

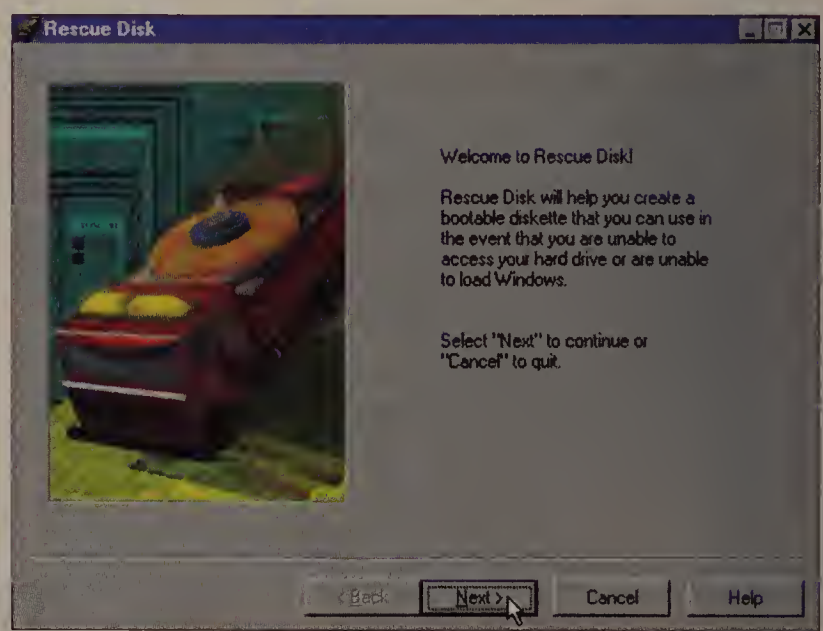
For the security conscious, Nuts & Bolts provides encryption that meets the U.S. government standard (128-bit Triple DES) or a publicly available method called 400-bit Blowfish that's even stronger. There's also a secure shredder feature that wipes out all traces of deleted files. And the Trash Guard feature extends Windows 95's Recycle Bin by saving files deleted within DOS.

All Windows 95 users know that the operating system is far from crash-proof: The dreaded 'Fatal Exception Error' means you've lost your work. But the Bomb Shelter feature in Nuts & Bolts can recover unsaved data, then prompt you to reboot. Helix claims that the utility works at a lower system level than others, such as Norton's CrashGuard, and can detect problems that competitors can't see.

Rounding out Nuts & Bolts is a raft of additional utilities. Zip Manager is a highly detailed hardware diagnostic and system information program. WinGauge, much like Norton's system display, graphically shows various system resources and performance. The tabbed EZ-Setup menu provides easy access to many Windows features, such as moving programs in and out of the Startup group.

With Nuts & Bolts, Helix has created a winning program.

—*Stan Miastkowski* ▶



RESCUE ME: Helix's Nuts & Bolts creates a single "rescue" floppy disk; competitors require several floppies.

Nuts & Bolts

PRO: Great price, comprehensive features.

CON: Not for inexperienced PC users.

VALUE: A bargain compared to Norton Utilities.

Helix Software

800/451-0551

www.helixsoftware.com

Street price: $50

READER SERVICE NO. 761

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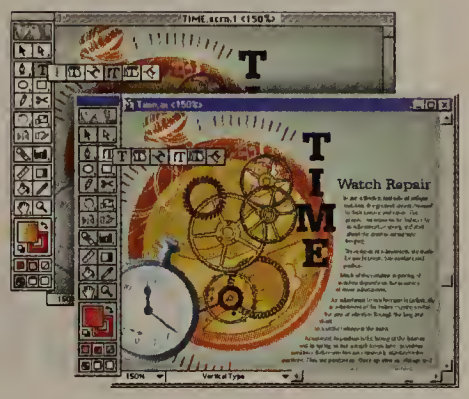

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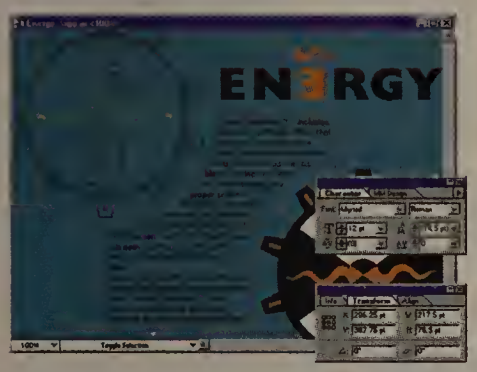

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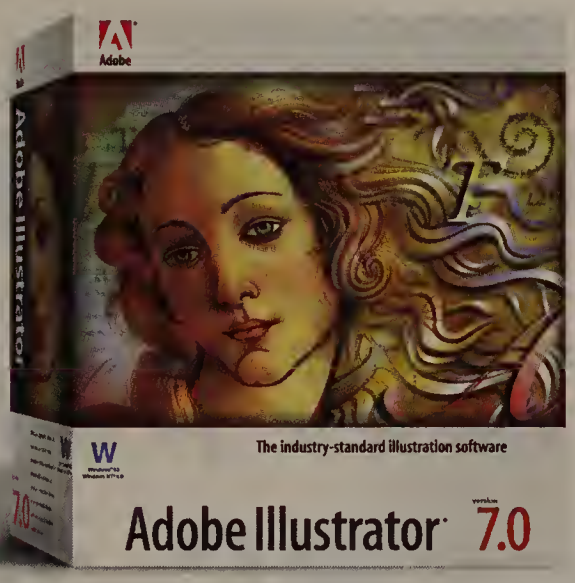

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Circle 32 on reader service card

It's the most powerful desktop PC we've ever offered.

Actually, it's the most powerful desktop PC anyone's ever offered.

pentium® II PROCESSOR

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We could compare the NEC PowerMate® Professional to ordinary desktops, but that wouldn't be fair. Enhanced by Intel's Pentium® II processor,* the PowerMate desktop is in a class all its own. Of course, we're not simply saying that our new system is extraordinarily powerful. It's extraordinarily manageable as well. With Intel LANDesk® Client Manager and NEC MagicEye™ technology, you'll not only be able to access every desktop throughout your network, you'll also be able to monitor problems before they happen. All without leaving your desk. For greater flexibility, there are Microsoft Windows NT® 4.0 or Windows® 95 models. Given all this, you'll be glad to know that the highest performing PC is available now. Just call **1-888-306-4636** for more information or to find your nearest reseller. Or visit our web site at **www.nec-computers.com.** After all, how can businesses demand speed and efficiency from their people if they can't get it from their computers?

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NEC

Circle 180 on reader service card

Smart Way to Share Statistical Reports Online

UTILITY

YOU NEED TO send a quarterly customer-satisfaction report to your client in 45 minutes, but your boss halfway across the country wants a peek first. You don't have time to fax the 150-page manifesto—but you can use **SPSS Smart Viewer** to post the report on the Web.

This program provides a flexible way to share numerical data and reports with colleagues and customers. (I used a preproduction version.)

List priced at $195, Smart Viewer allows all viewers to rearrange data using the program's pivot-table feature. Pivot tables let you condense mounds of statistical analysis into one table, then slice and dice the numbers.

Once you post a report online, other Smart Viewer users can view and rearrange the included statistics. SPSS also offers a free plug-in called Viewer, which allows someone to view the data but not rearrange it.

Workgroups will benefit most from Smart Viewer. For example, say one colleague wants to know how long customer hold times are, and the national sales manager wants to see if there's a correlation between hold times and sales weaknesses. You can set up the pivot tables, post them online, and send coworkers the bookmarked Web addresses to visit. Or you could send your colleagues to the whole packet of information and let them rearrange it as needed.

Smart Viewer is designed to work with SPSS's statistical package, SPSS for Windows, but it also works with other ActiveX-enabled applications. Pivot tables can be dragged into most presentations or word processing documents.

—Julie Campagna

SPSS Smart Viewer

PRO: Allows you to share and rearrange statistics-oriented reports on the Web.

CON: Somewhat expensive.

VALUE: Good choice for number-crunching workgroups.

SPSS Inc.

800/543-2185

www.spss.com

List price: $195

READER SERVICE NO. 747

QUICK TAKES

Voice Mail for Web Sites

A plug-in from Digital Equipment gives Web page designers an interesting tool: It lets people record and send voice e-mail from a Web page. Digital's free Voice Plugin, downloadable from its Web site (interface.digital.com/voice), works with Netscape Navigator 3.*x* or Navigator Gold 3.*x*. Visitors to your site download the plug-in and—if they have a microphone—can then record and send voice e-mail to your site or to any address that supports MIME attachments, using Navigator or Messenger e-mail. I found setup somewhat complicated, and audio quality was D-grade at best. But with a bit more work, this could become a useful option for Web pages. Digital Equipment; www.digital.com.

READER SERVICE NO. 748

—Glenn McDonald

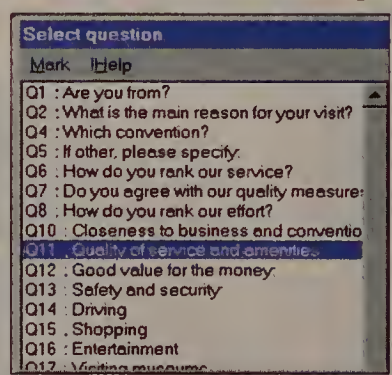
SurveyWin: An Easy Way to Poll

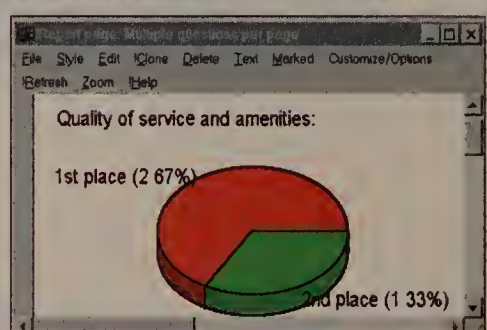
SURVEY

IF YOUR EYES glaze over at the thought of collecting and managing survey data, look into Raosoft's new Windows 3.*x*/95/NT version of **SurveyWin.** Based on my review of a shipping copy, this software is well suited for conducting online or workgroup polls. For example, you could use it to gather customer information or get opinions from colleagues.

SurveyWin's menu-driven interface makes it simple to design the forms that respondents will fill out. You can easily insert Yes/No buttons and fields for multiple-choice and open-ended responses.

The program automatically assigns values to each response and jumps over unrelated questions as respondents progress—so if you're doing a survey about what to serve at the annual awards dinner, vegetarians won't have to ponder meat-related topics.





SURVEY SAYS: USE SURVEYWIN to easily design and analyze online polls.

SurveyWin provides several distribution options: A form can be placed on a network, sent as an e-mail message, or exported as an HTML file for use on an intranet or Web site. People can respond via e-mail or store forms in a designated spot on the network.

Then SurveyWin analyzes the data, giving simple statistical information such as averages, minimums, and maximums, as well as more sophisticated analysis. You can use the program to test hypotheses through group comparisons, or compare observed and expected results. It also creates basic 2-D and 3-D graphics.

SurveyWin uses the .dbf format and can import and export common file types such Excel and text only.

At $495, SurveyWin is a bit pricey. Judge the value for yourself with the demo available on Raosoft's Web site.

—Paul Heltzel ▶

SurveyWin

PRO: Handles online and group surveys, analyzes data.

CON: A bit pricey.

VALUE: Good choice if you often use surveys.

Raosoft

206/525-4025

www.raosoft.com

Street price: $495

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Circle 56 on reader service card

Access Your Desktop PC From Your Palmtop

UTILITY

I USED TO LUG around a notebook PC to check my company e-mail. Then I switched to a pocket-size personal digital assistant that let me write and read e-mail. Now with Symantec's **pcAnywhere CE** software, I can access my entire office desktop PC from the road.

List priced at $79.95, pcAnywhere CE is the first program that lets you remotely access files, applications, and data from a handheld PC. It works with any Windows CE palmtop. (Windows CE is Microsoft's operating system designed just for handheld PCs.)

I tested a preproduction version on the handheld NEC MobilePro 400. While it successfully linked with my office PC (using a modem, a TCP/IP connection, or a direct serial link), I had to resize full-screen images to fit on the small device's display, and this task was not intuitive.

pcAnywhere CE's ezZoom and ezScroll options helped me navigate the host screen on the handheld PC. The zoom feature is a hot-key toggle that alternates between close-up and full-screen views of the desktop monitor.

I easily moved data from my palmtop into desktop applications using a clipboard option. Overall, pcAnywhere CE turns a Windows CE palmtop into a more useful device.

—*Michael S. Lasky*

PALMTOP WITH A DESKTOP VIEW: pcAnywhere CE is the first remote-access program for Windows CE palmtop computers.

pcAnywhere CE

PRO: Get into desktop files from your Windows CE palmtop.

CON: Resizing the screens can be confusing.

VALUE: One-of-a-kind program, worth the money.

Symantec

800/441-7234

www.symantec.com

List price: $79.95; $39.95 for existing pcAnywhere users

READER SERVICE NO. 750

QUICK TAKES

Easy Screen Captures

If you've ever tried to reproduce an image from your monitor by pressing <Print Screen>, then you know that solution leaves much to be desired. For one thing, you'll have to do a lot of cutting and pasting. And it's not easy to use Windows' Paint applet to do fancier tasks like image editing or saving a portion of the screen. ScreenPrint Gold gives you these functions and more. Other utilities, such as TechSmith's $40 SnagIt, also make generating screen shots easy, but the $35 (street price) ScreenPrint Gold offers some very handy extras: a thumbnail viewer, one-click attachment of files to e-mail messages, a simple but useful image editor, and an autotimer that generates screens at 10-second or longer intervals. ScreenPrint does an outstanding job for a reasonable price. Software Labs; 800/569-7900; www.softwarelabs.com/screenprint.

READER SERVICE NO. 751

—*Yardena Arar*

See the Light: Device Brightens Handheld PCs

GADGET

MOST HANDHELD PC screens are notoriously dark. Backlighting helps, but if you've already bought a costly PDA, you may not be ready to upgrade to a newer backlit model. Also, backlighting gobbles up battery life. But now an add-on solution is available: ASF Associates' **mini-PCL3 Ultimate Palmtop Computer Light.**

It illuminates PDA displays and keyboards using a low-energy, high-intensity bulb that sits in a swiveling, telescoping arm. This gadget also serves as a tiny reading lamp.

The 5-ounce light measures about 3¼ by 2¼ inches and is powered by three AA batteries or an AC adapter. You can position the mini-PCL3 in its desktop stand or use the included Velcro strips to fasten it to the back of your palmtop PC. It folds up easily.

The mini-PCL3 works with most full-size palmtops such as Windows CE handhelds, the Sharp Zaurus, the Psion Series 3c, and Hewlett-Packard units. ASF also offers other models that are suitable for smaller PDAs.

On the downside, the light's plastic housing could be more rugged. And I wish this item cost a bit less—$25 seems a bit steep for what you get.

—*Michael S. Lasky* ▶

INSTANT BACKLIGHTING: the mini-PCL3.

mini-PCL3 Ultimate Palmtop Computer Light

PRO: Big improvement for PDAs without backlighting.

CON: Plastic housing is a bit flimsy.

VALUE: A little pricey, but useful.

ASF Associates

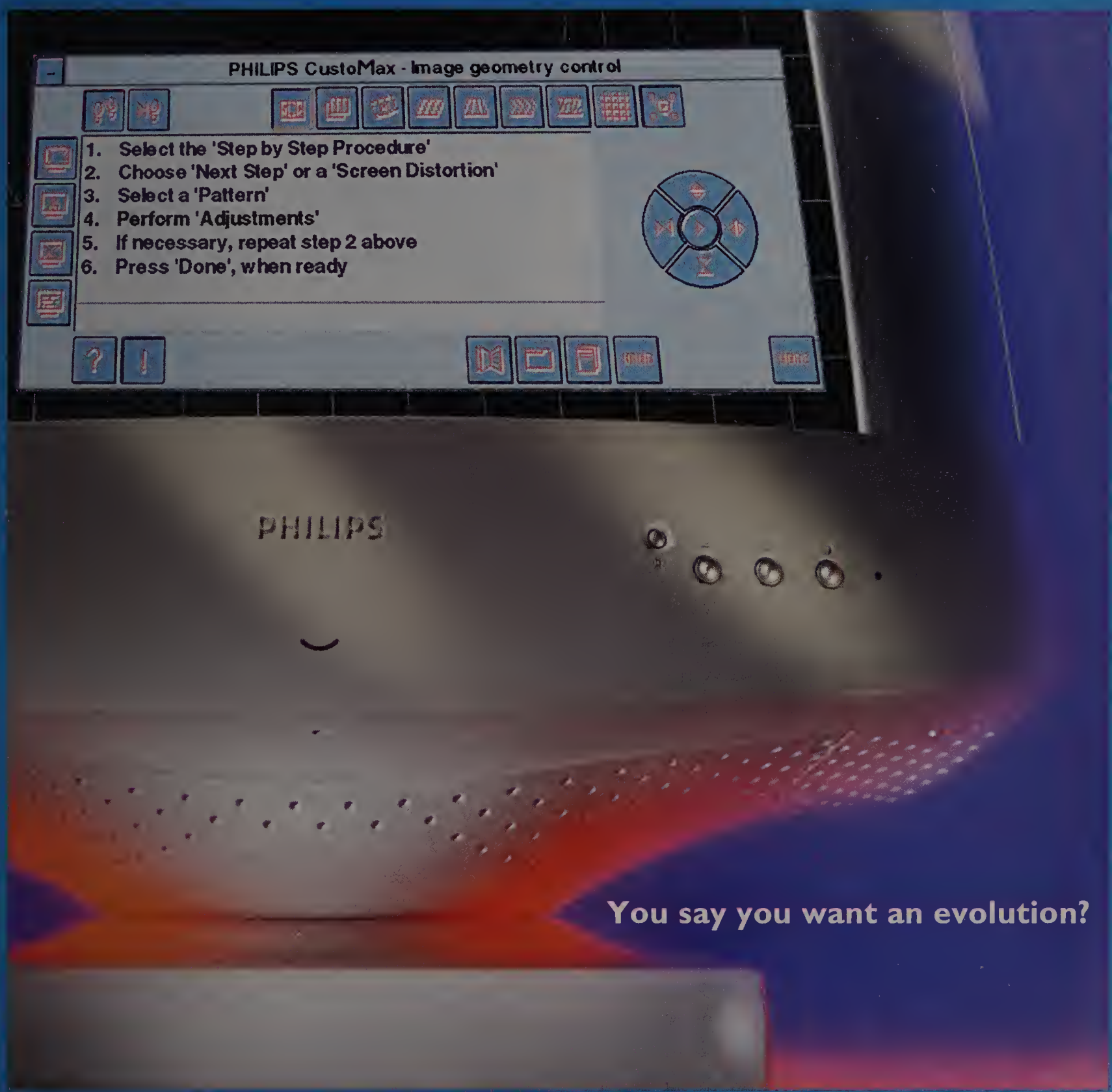
800/936-3638

www.world.std.com/asf1

Street price: $25

READER SERVICE NO. 752

Introducing the Brilliance Monitors with CustoMax™



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Internet: http://www.philipsmonitors.com

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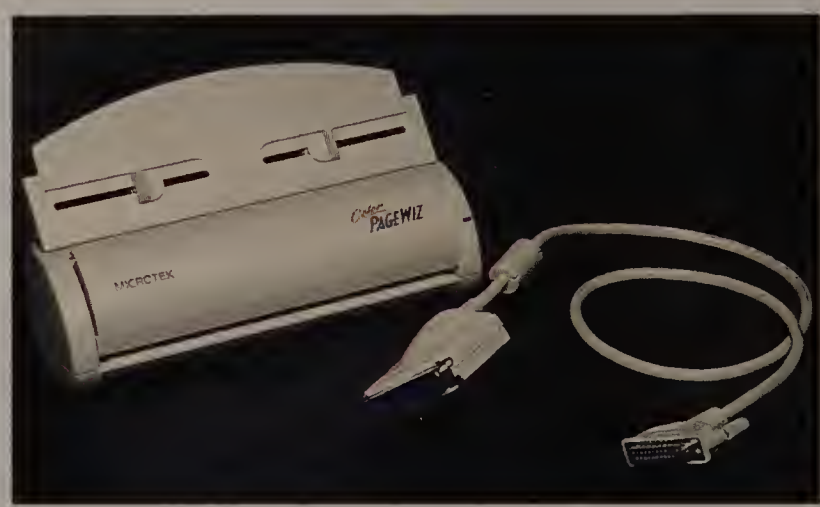
Circle 181 on reader service card

Stop Color Scanner Envy: Two Units for Less Than $200

SCANNER HAS A SHORTFALL of funds kept you from gathering your own digitized art or photos for print projects, Web pages, or presentations? You just lost your excuse. New scanners from Microtek and Spot InnoScan let you easily produce high-quality digitized artwork for under $200.

I tested shipping units of both. At $159, Microtek's **Color PageWiz** sets a new low price in its category. It's a good bargain. This compact, lightweight (3.3 pounds) sheetfed scanner produces 24-bit color images at 300 by 600 dots per inch in seconds. Installation is simple with a supplied cable that plugs into your PC's parallel port; a pass-through connector accommodates your printer cable. This setup lets you print scanned images immediately. (If you don't have a bidirectional parallel port, you'll have to change a setting in Windows 95's Device Manager.)

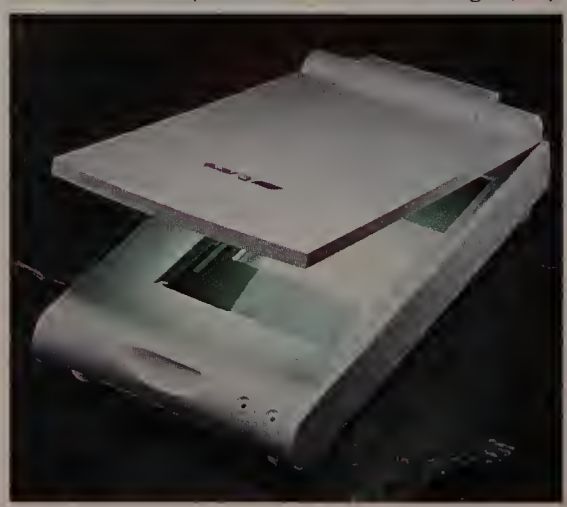


SCANNING WIZARD: Yes, you can afford a color scanner—Microtek's Color PageWiz works well and costs just $159.

The Color PageWiz comes with a smart collection of software, including Xerox Pagis SE for document management, the Xerox TextBridge Classic optical character recognition program for turning scanned documents into editable text, and Ulead iPhoto Express for scanning and image editing.

Any sheetfed scanner suffers some compromises. Despite the PageWiz's adjustable paper guides, I found it difficult to get documents straight, and I had to be careful to avoid paper jams. Also, the unit can't scan anything wider than a standard letter. That said, the Color PageWiz is ideal if you want an inexpensive, all-purpose color scanner for pictures and text—at home or in the office.

Spot InnoScan (a subsidiary of MAG InnoVision) offers a cut-rate flatbed scanner, the **FotoTak-6**, that is clearly intended for photos and drawings. It provides 30-bit color and 600-dpi resolution for only $199—an unprecedented price when you consider the FotoTak's features. It even lets you scan slides and transparencies with an included kit whose illuminated lid easily replaces the standard one. (The kit is free through July, $40 thereafter.) The supplied FunScan application suite provides tools for everything from creating T-shirts to manipulating images.



A BARGAIN: For $199, you won't find another 600-dpi color scanner like the FotoTak-6.

Limitations? With a scanning area of 5 by 7 inches, the FotoTak-6 is too small for letter-size documents, so it's a poor choice for scanning pages from many books. Installation requires opening your PC to insert an adapter card; one of four supported I/O memory addresses must be free, which might be a problem for a loaded system. But you won't find another scanner like it for the price.

—Yardena Arar ▶

Color PageWiz

PRO: Inexpensive and lightweight, with good software.

CON: The usual sheetfed-scanner gripes.

VALUE: An affordable all-purpose color scanner.

Microtek
800/654-4160
www.microtekusa.com
Street price: $159

READER SERVICE NO. 762

FotoTak-6

PRO: Inexpensive, 600 dpi, slide kit.

CON: Too small for faxing letter-size documents.

VALUE: Excellent price for a high-quality color scanner.

Spot InnoScan
800/611-7768
www.spotinc.com
Street price: $199

READER SERVICE NO. 763

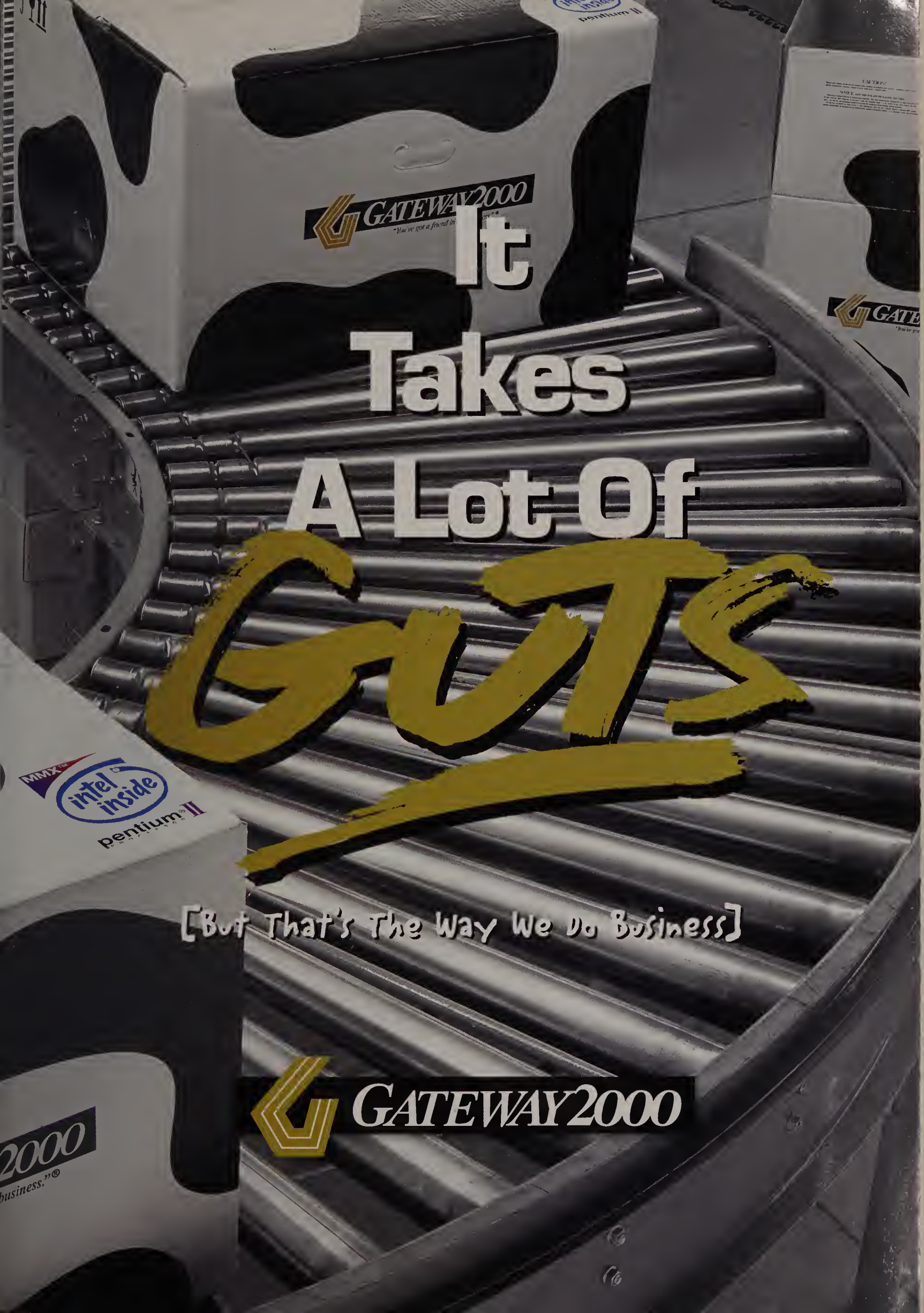
QUICK TAKES

Handy Surge Protector

When the lights went out in my neighborhood one night, it didn't seem like such a big deal. But the next morning I found out the electric surge had fried my PC's hard disk, and the cheap strip box I had been using proved to be nothing more than an extension cord. The Kensington SmartSocket would have been welcome. It comes in two models—a strip with six sockets, and a large brick that handles up to six wide AC adapters (box-type plugs) with no overlap. Both models are street-priced at $20 and provide modem and fax protection as well. The $50 premium adapter model with an 8-foot cord handles 1500 joules—that's enough to protect against almost all electrical spikes and surges. Another smart feature: Each socket is color-coded, and an included matching color label lets you identify which device is plugged into each outlet. Kensington; 800/535-4242; www.kensington.com

READER SERVICE NO. 764

—Michael S. Lasky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A Lot Of
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GUTSY SYSTEMS

[Powered By Pentium® II Processors]

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[This G6-266XL is loaded to the max, including a huge monitor with a 19.7-inch viewable area and the Boston Acoustics® High-Fidelity 3-Piece Speaker system.]

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- 6.4GB 10ms EIDE Hard Drive
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Rem able Storage Kings!
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Computer Shopper readers agree — we've blown them away for 6 years running! Best Buy awards keep flying in the door.

BUCKING

TRENDS

Gateway Does It Ag

Last fall Gateway broke away from the pack and launche the Intel Pentium Pro processor into the home PC market bringing 32-bit processing to the masses. People around the globe took advantage of the opportunity and beefed up their home computing. (Sorry Gateway, no pun intended.)

Now Gateway's doing it again. Main Street U.S.A. will have equal access to Intel's newest technology, the power-packed **Pentium II processor**. While some industry leaders are holding back, waiting for Pentium II processors to take off in the workplace, Gateway 2000 rocks the consumer world. More power to them.

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the day, every day of the week.
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corporate Gateway customers even have their own
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support team
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specifically to
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More computin
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• Volume 11 • Number 6

GUTSY COMPANY

[Blazing New Trails]

At Gateway 2000, we do things differently. Who else would headquarter a computer company in South Dakota? And even though we've grown beyond our Midwestern borders, our prairie heritage is still reflected in our pioneering spirit and dedication to technology and value.

Technology Pioneers

When we first stampeded onto the computer scene with a national ad starring cows, the phones went crazy and the competition started losing sleep. Gateway's unique blend of technology, quality, service and price were unmatched in the computer industry then, and we've been raising the bar on industry standards ever since. We're committed to bringing you cutting-edge technology. As Intel's new processors have been released (i386, i486, Pentium®, Pentium® Pro, Pentium® with MMX™ technology), Gateway has forged the way, letting you get your hands on the gutsiest technology out there. Now we're doing it again with Pentium® II processors. You don't have to settle for yesterday's technology or wait to be let in on the "secret."

We're also raising mobile computing to new levels with our high-end Gateway Solo™ 9100 multimedia notebook. The flexible modular design, next-generation 13.3-inch XGA display, combo CD-ROM/floppy drive and 4MB video RAM will make you the envy of desktop and portable users alike. It's a no-compromises PC custom built with the latest portable technology, including two 12-cell lithium ion batteries and hard drives that go all the way up to 3GB. Plus, new standard ports like USB and NTSC/PAL In and Out make the Gateway Solo 9100 the ultimate in notebook connectivity.

Gateway has the guts to stand behind this technology with a three-year limited warranty* on desktop PCs, a one-year limited warranty* on portables (optional upgrade to three years), and award-winning telephone service and support 24 hours a day, seven days a week for the life of your system.

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- TelePath Modem *for Windows* with x2 Technology*
- Desktop Case
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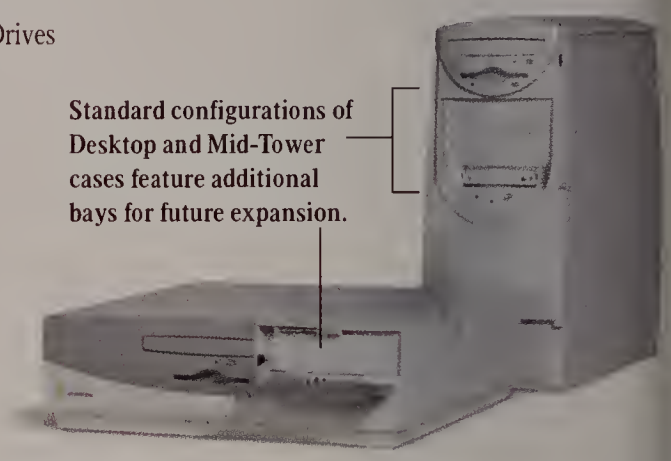

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- 4GB 8ms Ultra Wide SCSI-3 Hard Drive
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- 104+ Keyboard & MS IntelliMouse
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- CrystalScan700 .28dp Monitor (15.9" viewable area)
- 2MB 3-D 64-Bit PCI Graphics
- 3.2GB 12ms EIDE Hard Drive
- 12X min/16X max CD-ROM & 3.5" Diskette Drives
- Mid-Tower Case
- 104+ Keyboard & MS IntelliMouse
- MS Windows 95 & MS Office 97, Small Business Edition plus Encarta 97◆
- Gateway Gold Service & Support for Desktop PCs

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G5-166

- Intel 166MHz Pentium Processor
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- 256K Pipelined Burst Cache
- CrystalScan500 .28dp Monitor (13.9" viewable area)
- 2MB 3-D 64-Bit PCI Graphics
- 1.6GB 12ms EIDE Hard Drive
- 12X min/16X max CD-ROM & 3.5" Diskette Drives
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- USB & Zoomed Video Ports
- NTSC/PAL Video Input & Output
- 3GB Hard Drive
- 16-Bit Wavetable Sound & Stereo Speakers
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- Deluxe Carrying Case
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- Gateway Gold Service & Support for Portable PCs

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- 2MB EDO Video RAM
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- Modular 3.5" Diskette Drive
- Zoomed Video Port
- NTSC/PAL Video Output
- 2GB Hard Drive
- 16-Bit Wavetable Sound & Stereo Speakers
- Lithium Ion Battery & AC Pack
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- EZ Pad Pointing Device
- Carrying Case
- MS Windows 95 & MS Office 97, Small Business Edition plus Encarta 97◆
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2100LS

- 11.3" SVGA DSTN Color Display
- Intel 120MHz Pentium Processor
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- 256K Pipelined Burst Cache
- 1MB EDO Video RAM
- Modular CD-ROM Drive
- Modular 3.5" Diskette Drive
- Zoomed Video Port
- 1GB Hard Drive
- 16-Bit Sound & Stereo Speakers
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- **Additonal Destination 31-Inch VGA Color Monitor $999**
  (Call for details.)

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- Within current on-site service agreement $129

For our complete line of software and peripherals call GATEWAY™ component add-on sales at 800-846-2080.
Sales Hours: 7am-10pm Weekdays (CT).

††On-site service is available ta mast lacatians in the cantinental United States, Alaska, Hawaii, Puerta Rica and Canada after yau and yaur Gateway technician determine an an-site visit is necessary. On-site service is provided by PC Technalagy Services, Inc. On-site is nat available far any manitar, mause, keyboard, or portable system. Write ar call far a free capy af the an-site service agreement.

GUTSY EXTRAS *(Available to existing customers and new Gateway customers with system purchase.)*

GATEWAY SELECT

Our Gateway Select program lets you know you're getting software that meets or exceeds our standards for quality, value and ease of use.

Software

- **Games & Entertainment Pack II** Includes Bug!™; Deadlock™; MechWarrior® 2: Mercenaries™; 9™; Pitfall: The Mayan Adventure®; SPQR: The Empire's Darkest Hour™; and PC ProPad gaming device. $99
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- **Kid's BackPack™ IV**
  Includes Math Blaster®: In Search Of Spot, Freddi Fish™ And The Case Of The Missing Kelp Seeds™, Pajama Sam™ In "No Need To Hide When It's Dark Outside,"™ Just Me And My Mom™, and Muppet Treasure Island™. $59

Extras

- MS SideWinder™ 3D Pro Joystick $59
- APC® Back-UPS® Office $149
- APC Back-UPS Pro 650 $329
- Epson® PhotoPlus™ Color Photo Scanner $199
- Epson PhotoPC™ 500 Digital Camera $499
- Visioneer™ PaperPort Vx™ Scanner $249

Printers *(Each printer includes cable and ink cartridge.)*

- Epson Stylus® Color 400 Ink Jet Printer $229
- Epson Stylus Color 600 Ink Jet Printer $299
- Epson Stylus Color 800 Ink Jet Printer $449
- Hewlett®-Packard DeskJet 694C Color Printer $299
- Hewlett-Packard DeskJet 820Cse Color Printer $349
- Hewlett-Packard LaserJet 6P Laser Printer $749

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Matrox Graphics Card for Professionals: The Next Millennium Comes Early

GRAPHICS

GRAPHICS professionals or anyone who needs to view their work on large monitors at high resolutions will appreciate the **Matrox Millennium II** graphics board. It works extremely quickly in Windows 95 programs, even at resolutions of 1024 by 768 and higher. In fact, the Millennium II supports the 1800 by 1440 resolution of the newest and most sophisticated 21-inch monitors.

SPEEDING TICKET: Matrox's new Millennium II board helps a PC make fast work of 2-D and 3-D graphics at high resolutions.

The Millennium II is a good choice for people doing CAD or 3-D animation work. The board uses "scatter-gather" bus mastering, which lets it carry out 3-D commands while the CPU performs other calculations. It also supports a 32-bit Z buffer, which adds detailed depth to 3-D models. During informal testing of a shipping version, the Millennium II handled complex 3-D scenes at top speeds.

The new Millennium board has an improved video playback engine and is highly upgradable. The 4MB version goes for $399; pricing for an 8MB version was not set at press time. For professionals who need this type of power, it's money well spent.

—*Brad Grimes*

Matrox Millennium II

PRO: Fast 2-D and 3-D acceleration, excellent performance even at high resolutions.

CON: Expensive.

VALUE: Worth the money for graphics professionals.

Matrox Graphics
800/317-2348
www.matrox.com/mga
Street price: $399

READER SERVICE NO. 765

QUICK TAKES

Inexpensive Graphics Boost

If you want to turn your Pentium PC into a graphics workstation without spending big bucks, you need something like the new Diamond Multimedia Fire GL 1000 3-D accelerator. For $300—about half of what workstation-class boards usually cost—the Diamond board helps you create 3-D animations, virtual worlds, and computer-aided designs. It supports the major application programming interfaces (OpenGL, Heidi, and Direct3D) and comes with Macromedia's Extreme 3D and Integrated Data Systems' V Realm Builder. The board comes with 4MB of SGRAM. Diamond Multimedia; 800/468-5846; www.diamondmm.com

READER SERVICE NO. 767

—*Brad Grimes*

Inexpensive Way To Capture, Share Video Clips

VIDEO CAPTURE

UNTIL NOW, capturing full-motion video clips has required costly capture boards that were often tricky to install and use. Not so with the $229 **Alaris QuickVideo Transport**. You attach the device, which is about the size of a television's remote control, to your PC's parallel port. You're then ready to capture video from any NTSC/PAL video source, such as a camcorder, TV, or VCR. Once the video clip is saved on your PC, you use the included Videogram Creator software to compress it.

I saw some amazing compression ratios with the preproduction unit I tested. In one instance I compressed a 273MB video clip down to 1.4MB—small enough to fit on a floppy disk. Keep in mind, though, that video clips are huge: You might get only 60 seconds of video with sound on a floppy.

Compressed "videograms" are ideal for posting on a company Web site, distributing on CD-ROM for training purposes, or sending through e-mail. With the 100K video player you can embed into the videogram file, the recipients don't need special software to view your clip—and they can see it immediately.

Bear in mind that we're not talking professional-looking video here. The QuickVideo Transport captures in AVI format at 320 by 240 resolution; frequently, the playback is a bit choppy, and the audio and video are not always synchronized. But for those quick-and-dirty situations where video will help you make your point, this device is ideal. A bundled copy of CU-SeeMe also allows you to use the Alaris QuickVideo Transport to do basic videoconferencing.

—*Brad Grimes* ▶

Alaris QuickVideo Transport

PRO: Inexpensive, easy to set up and use.

CON: No pass-through port for your printer.

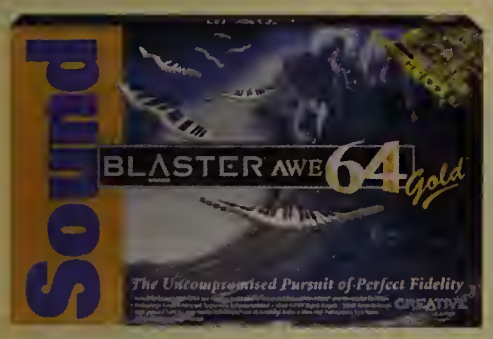
VALUE: An affordable way to capture and share video clips.

Alaris
800/317-2348
www.alaris.com
List price: $229

READER SERVICE NO. 766

AWE 64

SOUNDS OF THE *Symphony*



Experience an evening at the symphony with the new Sound Blaster® AWE64 Gold™ and hear every crisp sound with perfect audio fidelity. The Sound Blaster AWE64 Gold is simply the best sounding Sound Blaster ever. And it's designed specifically to upgrade your PC's multimedia audio system. Play back up to 64 simultaneous voices, producing a richer, fuller sound than previously thought possible. With 20-bit digital output, audio quality is uncompromised. And of course, compatibility is assured because it's a genuine Sound Blaster. To listen to and learn more about the Sound Blaster AWE64 Gold contact us at:

www.SoundBlaster.com/sound/AWE64Gold.

CREATIVE®
WWW.SOUNDBLASTER.COM

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Circle 54 on reader service card

1. Maestro Tapping Baton.
2. Piano Keys Dancing.
3. Entrance Of An Oboe.
4. Crashing Cymbals.
5. Violin Vibrato.
6. "Bravo, Bravo!"
7. Deep, Rythmic Grooves of a Cello.
8. Clarinet Scaling Octaves.
9. Audience Shuffling In.
10. Appreciative Applause.
11. Chord Progressions On Grand Piano.
12. Soft Strokes Of Harp Strings.
13. Chiming Triangle.
14. "Shhhhhhhhh..."
15. A Cymbal Brushing Lightly.
16. Cascading Clarinet.
17. Flute Solo.
18. Crescendo.
19. Playful Flirtation Of A Piccolo.
20. Boom Of A Tuba.
21. Pager Beeping.
22. Loud Clapping.
23. Low Tones Of A Stand-Up Bass.
24. Violin And Viola En Duet.
25. Piano Sonata.
26. Wailing Saxophone.
27. Smooth Slide Of A Trombone.
28. Exclamation Of A Trumpet.
29. Rolling Thunder Of A Timpani.
30. Arpeggio On The Violin.
31. The Reed Section.
32. Pages Of Sheet Music Turning.
33. Piano Playing Minuet In G.
34. Drum Keeping Tempo.
35. Violin Staccato.
36. Tambourine Jingle.
37. Clicking Castanets.
38. Relentless Beating of Drums.
39. Regal Sound Of A French Horn.
40. Snare Drum Rattling.
41. Xylophone Resonating.
42. The Low Pitch Of A Bassoon.
43. Cello Staccato.
44. Pulsating Viola.
45. Viol D'Orchestre.
46. Flute Ensemble.
47. Fluttering Of A Flute.
48. Regimental Sound Of A Bugle.
49. Plucking Of A Violin.
50. "Encore! Encore!".
51. Orchestra Tuning Up.
52. Silence Between Passages.
53. Harmonic Wind From A Flute.
54. Oboe Solo.
55. Soft Snoring.
56. Decrescendo.
57. Beethoven's 5th
58. Throats Clearing.
59. Chopsticks.
60. Sounds Of Intermission
61. Brass Solo.
62. Rattling Of Maracas.
63. "Wake Up, Honey, It's Over."
64. The Final Movement.

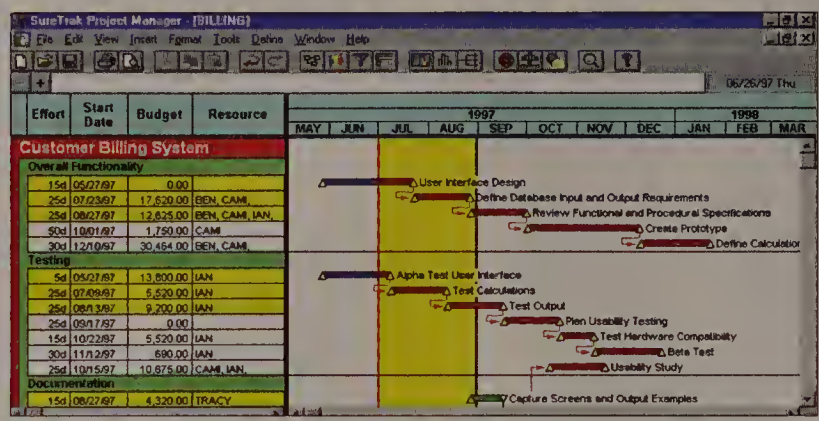
SureTrak 2.0: Easier Project Management

M B A - W A R E

NO ONE I KNOW finds project management software easy to use—and if it's not easy, it defeats the whole purpose. But Primavera's **SureTrak 2.0** actually does the job, based on the beta version I tested. Expected to sell for $399, the new version of SureTrak adds helpful features, including an animated tutorial, wizards that simplify complicated tasks, HTML publishing for Web-based reports, and e-mail updates for team members.

I started my work with the Project Kickstart Wizard, which handles the basics of the planning process. I had to fill in the details, but I was able to create a framework for my project easily. (With other packages, this is often the most difficult part of the process.) A new form made explaining activities a simple task. And as I started assigning resources, I appreciated the flexibility to assign staff projects in hours without the convoluted "percent of availability" work-around I've had to use with other project management products.

The program also allows flexibility as the project progresses. For instance, pausing a project and giving it a new starting date later, or adjusting the duration and the due date for a certain task, are simple with SureTrak. These features help keep the plan accurate.



PROJECT AN ORGANIZED IMAGE: SureTrak 2.0 enables you to manage group projects effectively and chart their progress.

I've had projects suffer because of poor communication, so I liked SureTrak's ability to send and receive updates, screen snapshots, and other tidbits through e-mail. The package includes the Primavera Post Office, a sharable applet for remote viewing and updating of project tasks and assignments. It's a slick way to check on project status and keep team members—even those who don't have their own copies of SureTrak—apprised of which tasks and deadlines they own. You can also send a compressed version of the entire project file, to be opened only by another SureTrak user. It's a clever safety feature.

In addition, SureTrak 2.0 lets you export and import projects in Excel's pivot table format, and you can use a Web publishing wizard for exporting project reports in HTML format. That's handy for company intranets.

All in all, SureTrak 2.0 is worth considering.

—Matthew Leeds

Primavera SureTrak 2.0

PRO: Useful on-screen help; e-mail and Web features.

CON: Not cheap.

VALUE: Good choice for time-pressed managers.

Primavera Systems
800/973-1335,
610/667-8600
www.primavera.com
Street price: $399

READER SERVICE NO. 768

HotDocs Pro Helps Create Forms in Minutes

F O R M S

CREATING TEMPLATES in a word processing application is tricky unless you're pretty good with macro languages. Creating forms requires something like a miracle. That's where **HotDocs Pro for Windows 95** comes in—it's the newest member of Capsoft's HotDocs line of document-assembly software. HotDocs Pro can automate the process of creating often-used forms and documents, including memos, purchase orders, contracts, leases, and price quotes. The program not only guides you through the process of building text-based templates, but it also automates graphical forms, even ones with multiple fields or check boxes. I tested a shipping copy.

Starting work on an existing form is simple, as long as it's in a format that Windows can print. Just output the form using the HotDocs Automator printer driver, and it becomes a HotDocs form. Now you can use the software's customization features to make the form easy for your coworkers to use.

For instance, you can create interactive dialog boxes that lead a person through the process of filling out the form. Certain fields in a dialog box can have scripts attached: The scripts read the information entered, then lead to the appropriate next step—or prevent a person from giving incorrect information.

Not everyone in your office needs the $399 HotDocs Pro package to use the forms and templates you create. HotDocs 4.0, which lists for $99, lets anyone work with forms created in the Pro version. Both products are worth the money.

True macro mavens can save their money and create homemade forms, but those of us who don't have the time will appreciate HotDocs Pro.

—Brad Grimes ▶

HotDocs Pro for Windows 95

PRO: Easily create templates and custom forms.

CON: Card-carrying macro experts can pass.

VALUE: A smart time-saver.

Capsoft Development Corp.
800/500-3627
www.capsoft.com
List price: $399

READER SERVICE NO. 769

AWE 64

SOUNDS OF INVASION

1. "We Come In Peace."
2. Blasting Ray Guns.
3. People Screaming.
4. "You Must Believe Me!"
5. Exploding Buildings.
6. Whirring Space Ships.
7. Brains Being Sucked.
8. Bones Crunching.
9. Aliens Phoning Home.
10. Metallic Scraping.
11. Cars Crashing.
12. Kidneys Bursting.
13. Insertion of Probes.
14. Heads Exploding.
15. "Run for Cover!"
16. "Warning."
17. Aliens Melting.
18. Pods Hatching.
19. Destroying the Monster.
20. Buildings Imploding.
21. Spaceships Docking.
22. Boiling Flesh.
23. "Mayday, Mayday!"
24. Exploding Spaceship.
26. "I saw a UFO!"
27. Planes Taking Off.
28. "We're at DefCon 1."
29. Aliens Communicating.
30. Children Crying.
31. Slurp.
32. Clink of Autopsy Instruments.
33. Laser Swords Crashing.
34. "Hyperspace!"
35. Flesh Being Torn Off Bones.
36. "They're Coming."
37. Wailing Sirens.
38. "You Must Die."
39. "Beam Me Up."
40. Zap!!!
41. Air Locks Closing.
42. "Oh, My God!"
43. Lasers Charging Up.
44. "We Need More Power!"
45. Ray Guns Blasting.
46. Calling the Mothership.
47. Horns Blaring.
48. "We Won!"
49. "Lock on Target!"
50. Crystals Charging.
51. Area 51 Guard: "No Admittance."
52. Zap-Zap!
53. Warning Alarms.
54. Air Locks Opening.
55. "Set to Stun!"
56. "Red Alert!"
57. Shields Up.
58. Warp Speed.
59. "Blast 'em!"
60. Eyeballs Squishing.
61. Spaceships Cloaking.
62. Radar Ping.
63. "Fire at Will!"
64. "Take Me to Your Leader."

Sound Blaster® AWE64 Value

The latest Sound Blaster technology is ready to invade your multimedia PC. At an out of this world price, **$99.99** (estimated street price), Sound Blaster AWE64 Value is your logical upgrade to high-fidelity audio. Hear every eerie sound with frightening clarity with up to 64 simultaneous voices of Advanced WavEffects™ & WaveGuide Synthesis. 512K onboard RAM for SoundFont® samples and high performance, lets you add your own alien sounds. Also included, the hottest Internet software. To learn more about the Sound Blaster AWE64 Value, contact us at: **www.soundblaster.com/sound/AWE.**

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Circle 59 on reader service card

Adobe After Effects Brings Wizardry to Web Pages and Presentations

GRAPHICS

WHAT'S A COUCH potato's favorite food? Eye candy. Whether it's scenes of battling starships or flashy title sequences with flying text, we've come to expect special effects in everything from Web pages to presentations. Adobe **After Effects**, available in a Macintosh version since 1991, has become popular among film producers, Web publishers, and CD-ROM designers. I tested a beta copy of the new version 3.1 for Windows 95 and NT.

EFFECTIVE VIDEOS: Adobe's After Effects spices up multimedia projects. It distorts and animates clips—and can even create lightning.

This $995 program is not for everyone. Buying After Effects to do basic video editing is like buying a Cuisinart to stir Ovaltine. However, if you need complicated, flashy effects to spice up a video, a multimedia project, or a Web page, you can't do better than After Effects.

Adobe's program lets you combine, stretch, spin, and otherwise alter video clips and still images. You begin by importing clips or images created in other programs. Then you position them within After Effects' Composition window and use the Time Layout window to specify how their properties—size, position, and appearance—should change over time. When you finish, you can render the final product, which might be a video clip or a series of stills that you import into an animation package.

To cook up these visual feasts, After Effects demands a Pentium-class PC and at least 32MB of RAM. (It is optimized for, but does not require, a Pentium MMX system.) Although you won't master the program in a day, its interface is efficient and precise. For example, you can show or hide each effect's parameters with controls that resemble those of Windows 95's Explorer. To adjust most effects, you click the mouse or type in exact numeric values.

After Effects also supports plug-in modules; dozens of Macintosh plug-ins are migrating to Windows.

After Effects will ship in a $995 Standard Version as well as in a $1995 Production Bundle that sports high-end video and film effects; only video or film pros need the latter.

—Jim Heid

After Effects 3.1

PRO: Professional-quality visual effects for video and online projects.
CON: Expensive.
VALUE: Excellent choice if you need high-end effects.
Adobe Systems
408/536-6000
www.adobe.com
List price: Standard Version $995, Production Bundle $1995
READER SERVICE NO. 770

Active Presenter: Make Your Pitch on the Web

PRESENTATIONS

"THE INFORMATION is on our Web site" is now a mantra for companies that have come to appreciate the Web as a great medium for increasing public presence. But what if you want a site to target specific visitors—say, potential customers—with more than a smattering of text-based fact sheets? With Software Publishing's **Active Presenter**, you can create compelling presentations and then publish them on the Web using a bundled companion application called **WebShow Publisher**.

You don't need to be a design guru or a programmer to use Active Presenter. It's aimed at people with no background in graphics or HTML. The program comes with 22 layouts, 14 designs, and 18 color schemes. You can add logos, clip art, and sound and movie clips to your presentation. A built-in component, ActiveChart, allows you to add charts and tables. (There's also an importer tool for work you've already done in Microsoft PowerPoint.)

With the bundled WebShow Publisher, you can easily publish Active Presenter presentations to the Web. A slimmed-down copy of Active Presenter can be distributed at no cost to anyone who will be viewing your presentation.

Consider the ways you might use Active Presenter. First, you can simply post the presentation for viewing at any convenient time. Second, you can get personal: Your marketing department could, say, arrange a conference call, get the interested parties on the phone and logged in to the company's Web site, and lead participants through the presentation. You can also make pitches to individual clients and conduct many types of business meetings.

—Joe Gomolski ▶

Active Presenter (With WebShow Publisher)

PRO: Easily create and publish presentations on the Web.
CON: Could use more design tools.
VALUE: Worth the money.
Software Publishing Corp.
800/794-6876, 408/537-3000
www.spco.com
Street price: $50
READER SERVICE NO. 771

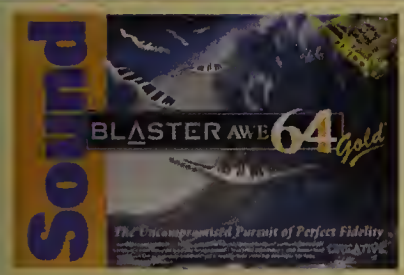
AWE 64

SOUNDS OF

A Traffic Jam

Beat the Rush!

1. Engines Pinging.
2. Horns Honking.
3. "Are We There Yet?"
4. "Where'd You Get Your License?!"
5. "I Need to Get to the Store Before They're Out of Sound Blaster AWE64's!"
6. Bumpers Crunching.
7. Sirens Wailing.
8. "Get Out of My Way!"
9. Cop: "License Please."
10. Muffler Dragging Behind Car.
11. Cars Crashing.
12. Engines Overheating.
13. Sunroof Opening.
14. Gasket Blowing.
15. Car Burning at Side of Road.
16. Tire Hissing.
17. Vroom Vroom.
18. Horn of a Semi Truck.
19. Car Phone Ringing.
20. "It's Your Fault!"
21. Brakes Screeching.
22. "What Do You Mean You Don't Have Insurance?!"
23. Music Blasting.
24. Horns Blaring.
26. Engines Revving.
27. Traffic Helicopter Overhead.
28. Tire Iron Hitting Pavement
29. Clunk of Transmission.
30. Blaring Radios.
31. Turn Signals Blinking.
32. Car Stalling.
33. Slurping Soda.
34. Changing Radio Stations.
35. Car Doors Opening.
36. Rolling Down Windows.
37. Shifting Gears.
38. Drumming on Steering Wheel.
39. Munching Potato Chips.
40. "I Wish I Had Some Coffee."
41. "Not AGAIN!"
42. Air Bags Popping.
43. Backfire.
44. "Why Didn't I Work at Home Today?"
45. Singing With the Radio.
46. @#$(!)%#!
47. Changing CDs.
48. "Hi Honey, I'm Going to Be Late."
49. Ambulance Siren.
50. Car Running Out of Gas.
51. Engine Choking.
52. People Arguing.
53. Glove Box Slamming Shut.
54. Door Locking & Unlocking.
55. Seats Moving.
56. "Are We There Yet?"
57. Cars Speeding By in Other Direction.
58. Rustling of Newspaper.
59. "I Told You We Should Have Taken the Other Freeway!"
60. Air Conditioner Blowing.
61. Pagers Beeping.
62. "There's a seven Car Pile Up."
63. "Are We There Yet?"
64. "It's Finally Moving!"



Sound Blaster® AWE64 Gold
$199.99
Estimated Street Price

Sound Blaster AWE64 Value
$99.99
Estimated Street Price

Upgrade to the hottest sound cards that will drive your PC audio into a new realm! Introducing the best sounding Sound Blasters ever, bringing high-fidelity to your multimedia PC at an incredible value. To learn more about the Sound Blaster AWE64's, contact us: **www.soundblaster.com/sound/AWE.**

Circle 69 on reader service card

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WWW.SOUNDBLASTER.COM

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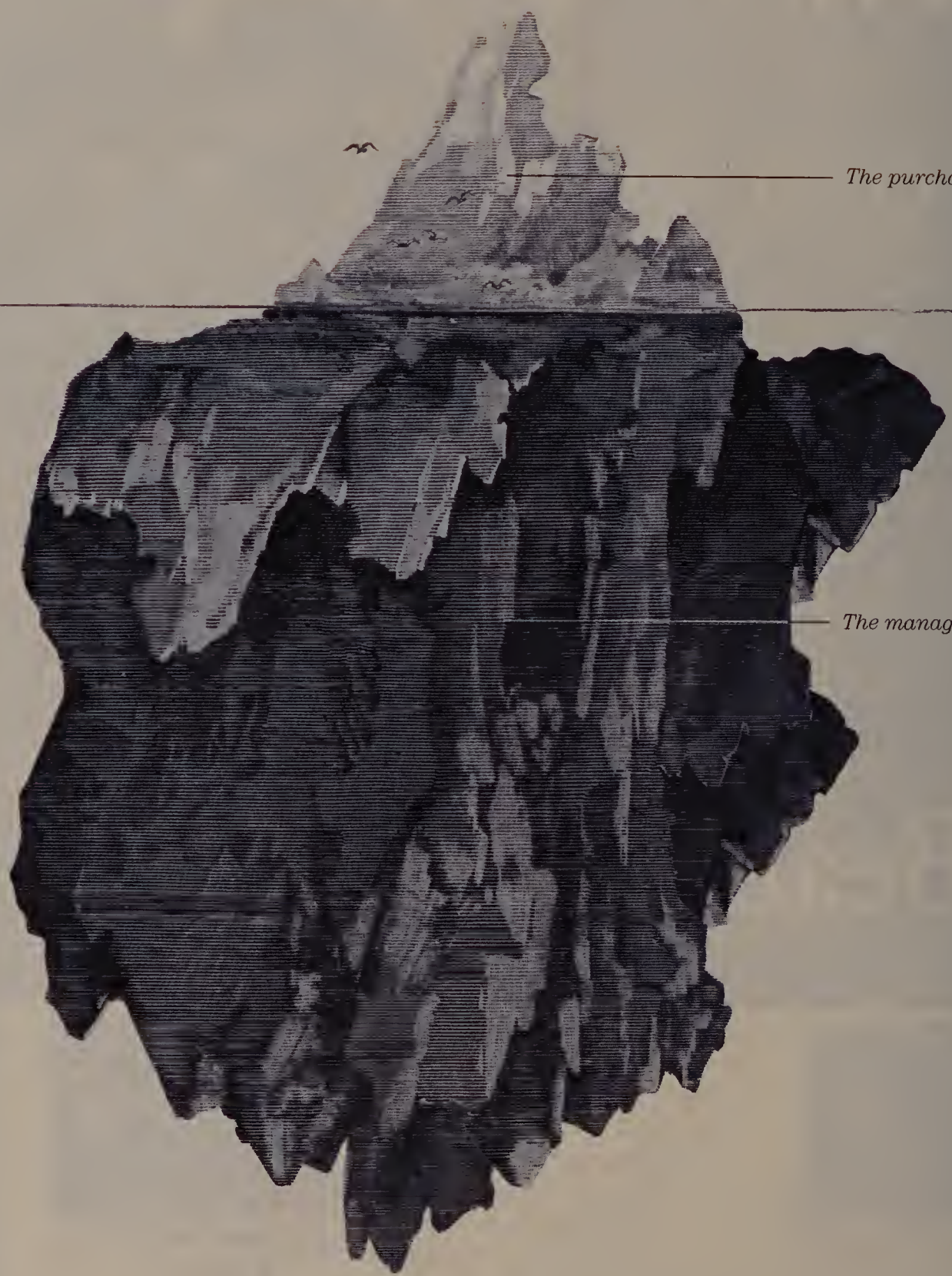
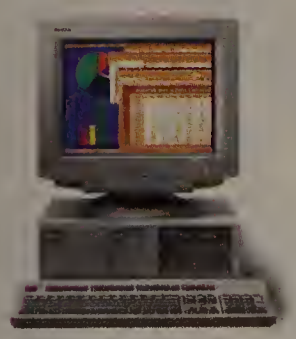


intel inside
pentium®
PROCESSOR

When choosing a PC for your company, remember the lesson of the Titanic. High PC management costs aren't just bad in themselves; they also translate into lost productivity. Worse, they suggest a PC environment barely under control. But at HP, we don't just make Intel® Pentium® processor-based PCs that you can manage. We make PCs that help you manage. Between our hardware and software features such as TopTOOLS and OpenView, we offer a host of non-proprietary, DMI-standards-based management solutions. You can remotely upgrade the BIOS of multiple PCs, monitor every PC in your network,* troubleshoot problems and, in general, minimize costs. The iceberg will still be out there, of course. But it won't be one you'll founder on. *www.hp.com/go/vectracommercial*



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Better products, better productivity.

HEWLETT® PACKARD

*Using TCP/IP protocol over the network. †Starting U.S. street price for HP Vectra VE Series 3. Monitor not included. Price includes HP DeskDirect J3239A LAN adapter card. Intel Inside and Pentium are registered trademarks of Intel Corp. ©1997 Hewlett-Packard Company PPG141

IT'S LIKE DIGITAL WHITE-OUT.

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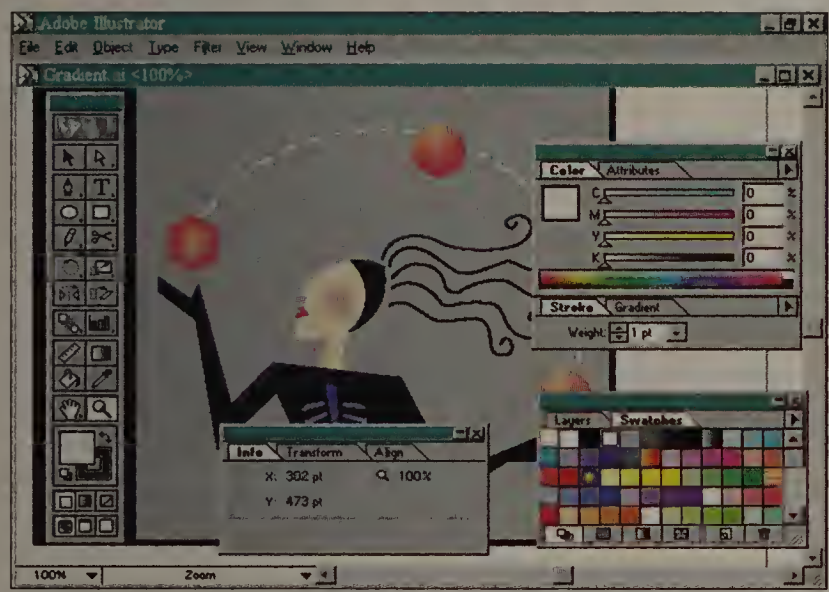
Circle 198 on reader service card

Adobe Illustrator 7: A Good-Looking Face-Lift

GRAPHICS

IT'S BEEN FIVE years since the last major Windows update of Adobe Illustrator, the veteran high-end illustration program. In the new version 7, you'll find cosmetic improvements that add up to a good face-lift.



ADOBE'S NEW LOOK: Illustrator 7 sports mostly cosmetic improvements, but the program's many tools are also easier to use.

Illustrator is playing catch-up: Favored by graphics professionals and amateur artists for years, its features were falling a bit behind those offered in Macromedia's FreeHand and Corel's CorelDraw. **Adobe Illustrator 7** looks better than the competition now, but by the narrowest of margins.

Illustrator 7 offers a much-improved interface. If you're a technical illustrator, desktop publisher, or Web developer who uses Adobe Photoshop and PageMaker, you'll find Illustrator 7's new unified look terrific: It mimics the menu structure, palettes, and keyboard shortcuts of those sibling products. Illustrator also now sports tool tips, single-key shortcuts for every tool, and context-sensitive menus that change depending on the part of the image selected.

Adobe has definitely made Illustrator more Web-friendly. The program now lets you attach Web addresses to images and supports RGB color. It can also export JPEG and GIF89a pictures—but oddly, it can't export HTML files, as CorelDraw can.

Graphic artists interested in getting the most professional package at the best price will be drawn to Illustrator 7.

—Shane Mooney ▶

Adobe Illustrator 7

PRO: Best professional illustration program.

CON: Not enough unique features to merit switching from CorelDraw.

VALUE: Definitely worth upgrading from an older version.

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Circle 188 on reader service card

Exabyte Eagle Nest: Most Flexible Storage

STORAGE

WOULDN'T YOU LIKE to have one drive that works with many types of removable storage? Then if you need to archive a folder full of files, you'd pop in a 100MB Zip disk—or maybe the higher-capacity but somewhat slower 120MB LS-120 "superfloppy" disk. To back up a whole hard drive, you'd insert a 4GB uncompressed (8GB compressed) Travan TR4 tape cartridge.

Of course, no single backup drive offers such flexibility. But Exabyte's **Eagle Nest**, a modular storage system, is the next best thing. I tested a shipping version.

You install the Eagle Nest "drive docks" in a PC's 5.25-inch external storage bay. You also need to install the 16-bit Enhanced IDE expansion card bundled with each Eagle Nest. Note that the product requires IRQ 10, 11, 12, or 15 to be free on the PC. (You can check IRQs on a Windows 95 PC by selecting the *System* icon in Control Panel, clicking *Device Manager•Computer•Properties*, and then clicking *Interrupt Request*.)

If you have the right IRQ free, the rest of the installation process is easy, thanks to Exabyte's step-by-step instructions. You'll need to load some software; then you can swap in a Zip, LS-120, or fast EIDE Travan TR4 module that you can share with workgroup members or move between your home and office PCs.

Swapping the modules is a snap: You slide each into an empty Eagle Nest unit and seat it by firmly pressing in on its front-mounted handle. To avoid system problems or corrupted data, power is delivered only after you lock the drive in place using the metal key that projects from the front. To remove the module, reverse the steps. There's no need to power down your PC while swapping drives. This is particularly convenient for sharing the drives among coworkers in an office.

Separate Eagle Nest units cost $90 with a 16-bit EIDE adapter. The Travan TR4 drive module costs $365 including the Nest, backup software, an EIDE adapter, and one cartridge. The Zip and LS-120 drive modules cost $230 each with the Nest (but without the disk). By the time you read this, Exabyte will have added a 1.4GB hard drive module and Eagle Nest system to its lineup for $399.

Overall, Exabyte's Eagle Nest products are an easy, affordable way to add storage.

—*Rex Farrance* ■

Eagle Nest Storage Products

PRO: Easy system for using EIDE TR4 cartridges, Zip disks, and LS-120 storage media.

CON: PC must have a free externally accessible drive bay.

VALUE: Affordable, sensible, and flexible storage.

Exabyte
888/637-8488
www.exabyte.com
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READER SERVICE NO. 773

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Designed for Microsoft Windows 95

So whether you're planning a takeover or a makeover, downsizing or upgrading, get the monitor that treats you like a friend.

After all, you never know when you may need one. Especially if you're Robert Schienberg.

Ideas that Shine

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- Microsoft® IntelliMouse®
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4 Site-Wiring Fault Indicator
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5 Convenient BlockSafe™ Outlet Spacing
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APC has won more awards for reliability than all other UPS vendors combined.

nultipath Back-UPS® Office™ was
– then the lights went out."

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7 Recessed Master On/Off Switch
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Power problems attack computers relentlessly. Did you know that you have a better chance of winning the lottery than of escaping power problems? They are the single largest cause of computer data loss and hardware damage.

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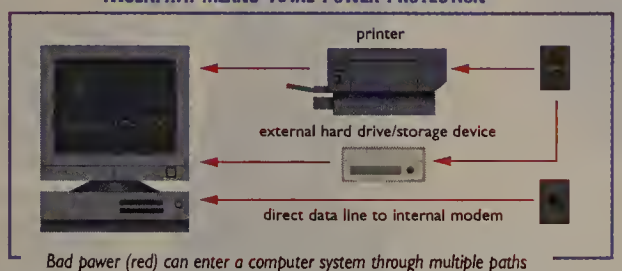
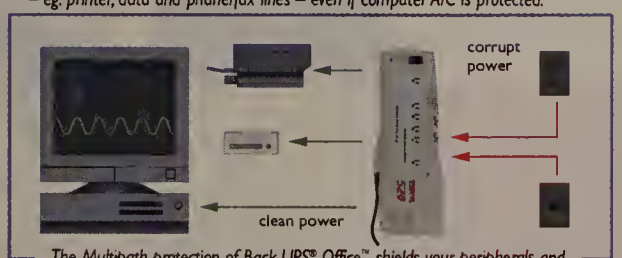
Unique multipath protection keeps your PC and data safe

Plugging phone lines or other peripherals into your computer increases your vulnerability to power problems. When a surge hits an unprotected peripheral, it can blaze down serial cables and datalines, and toast your expensive PC. Multiple peripherals and datalines to and from your system are vital, but dangerous. Without them you can't do your job. If a power sag locks your keyboard or reboots your computer before you've saved work, or while you are downloading from the Internet, you can lose data, time and money. Don't spend another late night at the office to meet your deadline. Join over 8,000,000 computer users worldwide who prefer APC to protect hardware and data.

MULTIPATH MEANS TOTAL POWER PROTECTION



Bad power (red) can enter a computer system through multiple paths – eg. printer, data and phone/fax lines – even if computer A/C is protected.



The Multipath protection of Back-UPS® Office™ shields your peripherals and guards your computer from bad power on every path, providing clean, safe power (green), to your entire system.

Back-UPS Office protects your entire system

Until now, protection for your entire system required several devices. Back-UPS Office means clean, safe power to every peripheral, and instant battery backup to keep your system from crashing. It means protection for less by integrating the security of a surge suppressor with the power of a UPS, guaranteed up to $25,000.

Only Back-UPS Office provides single device Multipath protection for all your equipment

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Data			•
Phone			•
Total Outlets	7	2	6
Number of Block Outlets			2
Protection from			
Surges	•	•	•
Spikes	•	•	•
Blackouts		•	•
Brownouts		•	•
Overvoltages			•
Typical Runtime in Minutes			
with Pentium 100 w/15" monitor		10	10
Battery backup for			
PC		•	•
Monitor		•	•
Storage Devices/Zip Drives			•
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Dataline protection for			
Internet or Network			•

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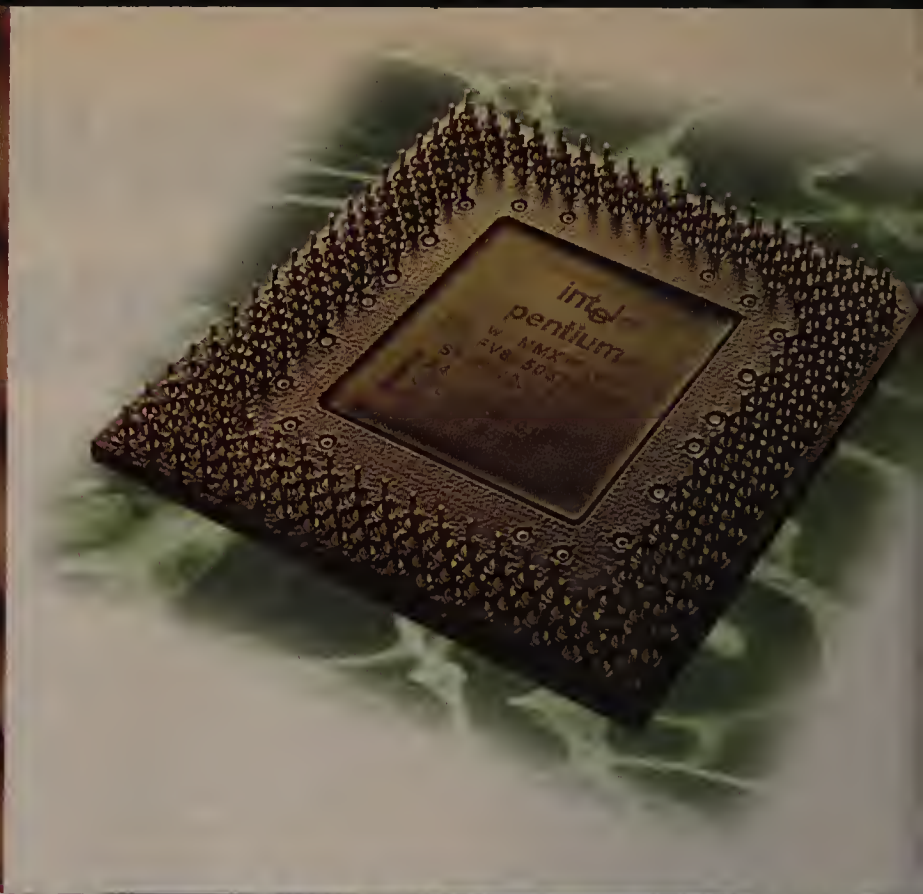
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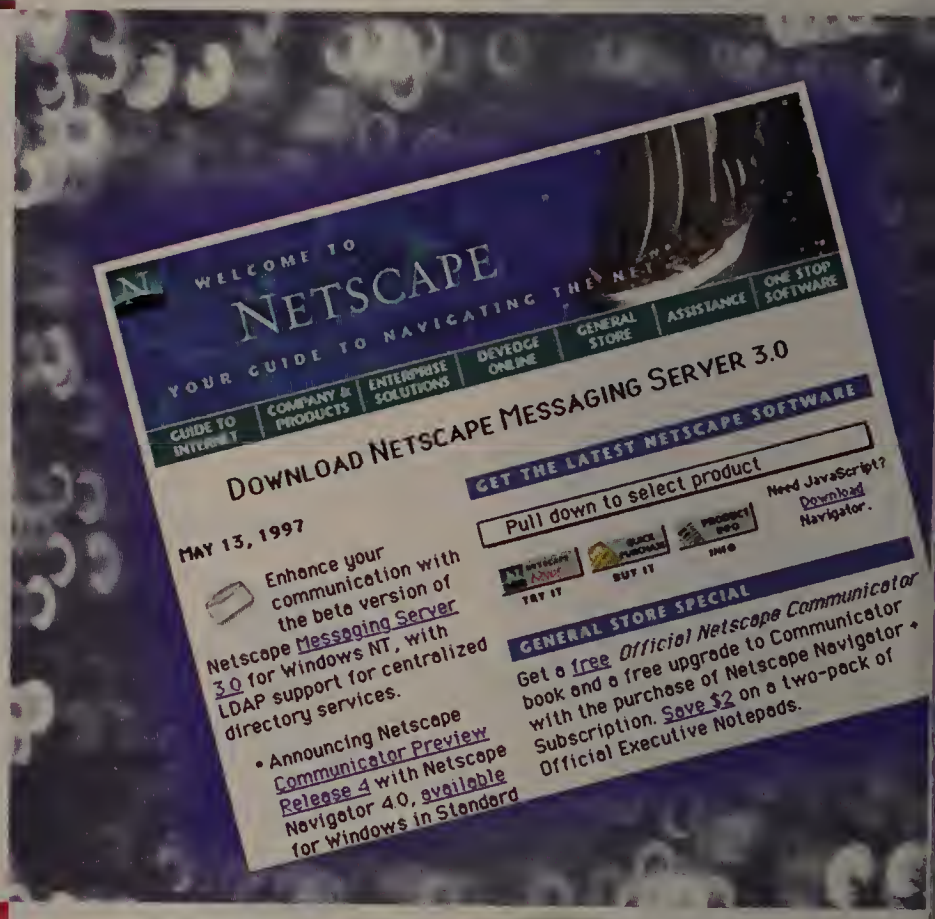
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Palm Pilot
Robotics

The Best Products of 1997

In a year that saw a quantum leap in PC processing power and an explosion of Web-related products, PC World's 15th World Class Awards spotlight the top products, companies, and Web sites in 84 categories.

BY JAMES A. MARTIN

WHAT A DIFFERENCE A YEAR MAKES. When we handed out our World Class Awards for 1996, we were still recovering from our post–Windows 95 hangovers. Pundits were predicting the rise of the $500 "network computer," while companies far and wide poured millions into their Web sites with little or no idea how to make any of the money back, let alone post a profit.

Now it's a whole new ball game. In 1996 Microsoft woke up, smelled the Java, and got serious about the Web—much to Netscape's chagrin. A spate of cheap new processors has made sub-$1000 Pentiums a reality—and made the still-vaporous network computer genre virtually moot. And now on those rare occasions when our machines are idle, instead of flying toasters, we get screenfuls of up-to-the-minute headlines, thanks to PointCast and its many "push" cousins. ▶

INSIDE

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With all this change, it's nice to know that at least two things remain constant: Virtually everybody's still losing money on the Web. And the World Class Awards, now in their 15th year, continue to honor the PC industry's best and brightest.

This year's highlights:

• Intel's MMX processor, the Pentium chip that speeds multimedia and graphics, was voted both Most Promising Hardware Newcomer and 1997 Product of the Year.

• Microsoft's Office 97 took the honors for Most Promising Software Newcomer. That's just one of a record 17 World Class Awards Microsoft was busy winning this year.

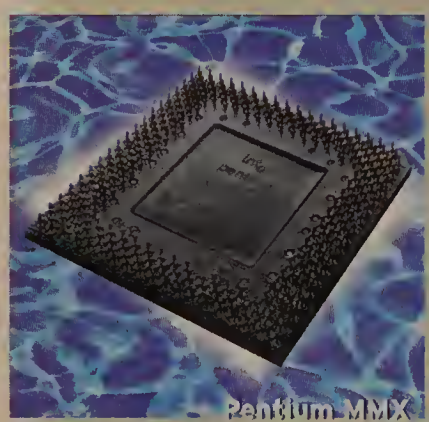
• Speaking of busy, America Online earned our judges' ire—and the Loser of the Year Award—by delivering nothing but busy signals to its 8 million members last winter. To be fair, AOL also got the nod for Best Online Service, proving that at least some things are worth waiting for.

This year our select panel of readers and industry mavens voted for award-winning products in 84 categories—the most in World Class Awards history and exactly twice the number of trophies we handed out ten years ago. Included in that number are eight brand-new Internet categories—from the top news/information service (PointCast) to the best Web search site (a dead heat between Yahoo and Alta Vista).

Of course, nobody is able to touch Microsoft in one category: operating system. Once again, Windows 95 was voted best of breed. But Win 95 may be facing some stiff competition in the coming year, mostly from its own siblings. A new version of NT and an upgrade to Windows 95 (codenamed Memphis) are both due out by year's end.

The following pages provide you with a one-stop shopping guide to the best hardware and software money can buy, our favorite Internet sites, and the top companies for mail-order sales and customer service. Don't leave home (or surf the Net) without it.

Product of the Year



Intel's Pentium processor is no stranger to our World Class citations. Last year, for instance, the Pentium Pro and the Pentium-166 tied with Iomega's Zip drive as Most Promising Hardware Newcomers. This year's Product of the Year, **Intel's MMX line of Pentium chips,** offers an exciting twist: significantly enhanced multimedia, graphics, and communications performance.

Even though there isn't yet an abundance of MMX-aware software, MMX's ability to make such applications soar pushed the chip over the top in our judges' estimations.

In recent *PC World* tests, for instance, an MMX version of Adobe Photoshop got a 50 percent speed boost. Best of all, some MMX PCs cost barely $100 more than standard Pentium systems. The plain old Pentium is dead; long live MMX.

@Work: Hardware

Business Desktop Computer
Gateway 2000 P5 line

For the third time in four years, South Dakota–based Gateway 2000's solid PCs, competitive prices, and vastly improved technical support put the P5 line ahead of the herd. $1499 to $2244 list, depending on configuration; 800/846-2000, www.gw2k.com

READER SERVICE NO. 788

RUNNER-UP: Micron Millennia line

Monitor 15"
NEC MultiSync XV15+

Despite increasing competition from the formidable likes of Sony and MAG InnoVision, NEC Technologies' venerable MultiSync line—with its strong name recognition and sharp graphics—continues to dominate both the 15- and 17-inch monitor categories. $399 street; 800/632-4636, www.nec.com

READER SERVICE NO. 789

RUNNER-UP: MAG InnoVision DX15T

Monitor 17"
NEC MultiSync M700

Released last spring, the M700 was one of NEC Technologies' first monitors based on the new CromaClear technology, which promised better image quality at prices comparable to those of NEC's Trinitron displays. $799 street; 800/632-4636, www.nec.com

READER SERVICE NO. 790

RUNNER-UP: Sony Multiscan 17sell

Input/Pointing Device
Microsoft IntelliMouse

Here's one mouse that has quickly become the big cheese. Introduced last fall, Microsoft's new IntelliMouse features a wheel/button design that lets documents—such as extra-long Web pages—practically scroll themselves. $84.95 list; 800/426-9400, www.microsoft.com

READER SERVICE NO. 791

RUNNER-UP: Logitech MouseMan 96

Graphics Accelerator Board
Diamond Stealth Video 3D 3000

When it comes to graphics accelerators, Diamond Multimedia's Stealth Video 3D 3000 series zooms to the top. Diamond's boards get extra points for photo-realistic, high-resolu-

tion color and the ability to play full-screen, full-motion video. $250 to $300 list; 800/468-5846, www.diamondmm.com

READER SERVICE NO. 792

RUNNER-UP: Matrox Millennium

Fax-Modem

U.S. Robotics Sportster Voice 28.8

U.S. Robotics' popular Sportster supports up to 33.6-kbps speeds, Caller ID, multiple voice mailboxes, and full-duplex speakerphone telephony, and it automatically distinguishes between incoming voice and fax calls. $180 street; 800/342-5877, www.usr.com

READER SERVICE NO. 793

RUNNER-UP: Hayes Accura 28.8

Sound Card

Creative Labs Sound Blaster AWE32 PnP

With powerful wavetable audio, 3-D stereo enhancement, and included software for making long-distance calls over the Net, Creative Labs' standard-setting Sound Blaster AWE32 PnP is the sound card to end all sound cards. $249.95 list; 800/998-5227, www.creativelabs.com

READER SERVICE NO. 794

RUNNER-UP: Creative Labs Sound Blaster AWE64

CD-ROM Drive

Plextor 12PleX

Think all CD-ROM drives are alike? Our judges would respectfully disagree, citing Plextor's high-performance 12PleX line of 12X internal and external drives. Available in both tray- and caddy-loading versions, they're favorites for their top speed, reliable performance, attractive prices, and full two-year warranty. $239 to $389 list; 800/886-3935, www.plextor.com

READER SERVICE NO. 795

RUNNER-UP: NEC MultiSpin

Hard Drive

Western Digital Caviar

What's Caviar without a bottle of bubbly? Uncork the champagne and raise a glass to Western Digital, whose extensive line of low-price, high-performance internal EIDE hard drives ranges from 1.6GB to 4GB. $200 to $400 street; 800/832-4778, www.wdc.com

READER SERVICE NO. 796

RUNNER-UP: Seagate Medalist Pro

Tape Backup Drive

HP Colorado Memory Systems

The secret to a long and happy life? Backing up your data regularly, of course. For sensible PC users, Hewlett-Packard's line of Colorado Memory Systems tape backup drives—from the 800MB T1000 to the whopping new 8GB T4000 models will prove nothing short of magnetic. $125 to $199 street; 800/752-0900, www.hp.com

Diamond Stealth Video 3D 3000

READER SERVICE NO. 797

RUNNER-UP: Iomega Ditto

Recordable CD-ROM Drive

HP SureStore CD-Writer

The trend of burning your own CDs is getting hot, thanks to continually falling prices and easier drive installation. Hewlett-Packard's latest SureStore CD-Writer drives burn brightest this year, thanks to an internal 6X CD-ROM reader and 2X CD recorder. SureStore CD-Writer 6020i $589 street; 800/810-0133, www.hp.com

READER SERVICE NO. 798

RUNNER-UP: Pinnacle Micro RCD

Rewritable Optical Drive

Panasonic PD-CD

All other contenders for this title were erased from memory by the debut of Panasonic's PD-CD, which conveniently combines two storage devices in one: a read-only CD-ROM drive and a rewritable 650MB phase-change optical drive. $500 to $600 street; 800/742-8086, www.panasonic.com

READER SERVICE NO. 799

RUNNER-UP: Fujitsu DynaMO 230

Logitech PageScan Color Pro

Multifunction Device

HP OfficeJet LX 350

It's a 600-by-300-dpi printer. A sheetfed scanner. A copier. A fax machine. Hewlett-Packard's OfficeJet has more personalities than Joanne Woodward in *The Three Faces of Eve*—but in this case, all those personas add up to one versatile powerhouse. $550 street; 800/810-0133, www.hp.com

READER SERVICE NO. 800

RUNNER-UP: Canon MultiPass C2500

Flatbed Scanner

HP ScanJet 5pse

For the fourth year in a row, a Hewlett-Packard ScanJet gets our judges' thumbs-up for best flatbed scanner. HP calls the 300-dpi color/gray-scale ScanJet 5pse its first "push-button" scanner: Plop your document on the glass, push the green button, select the document type (photo, text, fax, or other), and the scanner does the rest. $399 street; 800/810-0133, www.hp.com

READER SERVICE NO. 801

RUNNER-UP: Microtek Lab ScanMaker E3

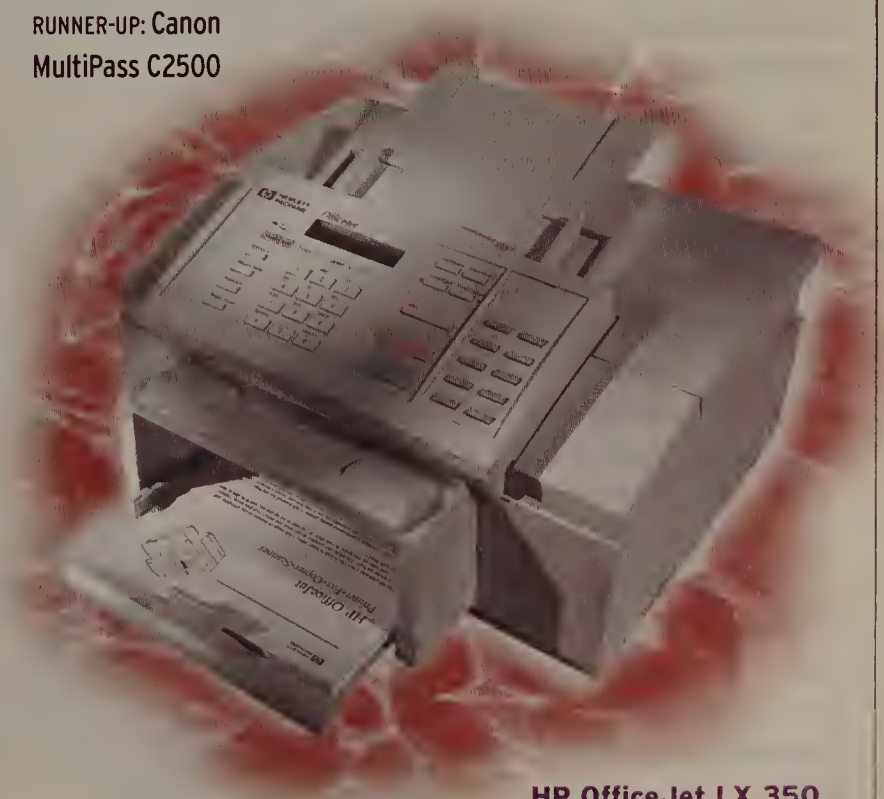
Sheetfed Scanner

Logitech PageScan Color Pro

Logitech's low-price 24-bit color scanner nudges out the popular Visioneer PaperPort Vx for top honors in this category. The PageScan Color Pro features 32-bit scanning software for Windows 95, along with full versions of Adobe PhotoDeluxe and Xerox TextBridge OCR software. $340 street; 800/231-7717, www.logitech.com

READER SERVICE NO. 802

RUNNER-UP: Visioneer PaperPort Vx ▶



HP OfficeJet LX 350

@Work: Software

Operating System/ Environment
Microsoft Windows 95

Now two years old, Microsoft's Windows 95 is still the operating system to beat—for the moment, at least. Windows NT 4.0 and the next version of Win 95 (code-named Memphis), due out possibly days before 1998, are turning up the heat. $109 street; 800/426-9400, www.microsoft.com

READER SERVICE NO. 803

RUNNER-UP: Microsoft Windows NT Workstation 4.0

Application Suite
Microsoft Office 97

Microsoft Office continues its stranglehold on the integrated application suite category. This latest version adds Outlook (formerly Schedule+), a PIM that's integrated right into the Windows desktop. Standard edition $499 street, Professional edition (with Microsoft Access) $599 street; 800/426-9400, www.microsoft.com

READER SERVICE NO. 804

RUNNER-UP: Corel WordPerfect Suite 7

Word Processor
Microsoft Word 97

Perpetual World Class winner Microsoft Word now features automatic HTML conversion, support for 3-D effects, an improved set of table tools, and a new Online Wizard. $339 street; 800/426-9400, www.microsoft.com

READER SERVICE NO. 805

RUNNER-UP: Corel WordPerfect 7

Spreadsheet
Microsoft Excel 97

Every year we crunch the numbers, and every year we get the same result: Our judges love Microsoft's Excel. The latest version lets multiple users work on the same spreadsheet simultaneously. You can also query Web sites directly and insert the data you get into a cell. $339 street; 800/426-9400, www.microsoft.com

READER SERVICE NO. 806

RUNNER-UP: Corel Quattro Pro 7.0

Professional Database
Microsoft Access 97

Microsoft Access gets kudos this year for its new Web hyperlink support, which allows you to browse sites right from a database, and for its Web Wizard, which makes it a snap to transform an Access object into a Web page. $339 street; 800/426-9400, www.microsoft.com

READER SERVICE NO. 807

RUNNER-UP: Borland Paradox 7.0

Fax/Communications Software
Symantec WinFax Pro 7.5

Symantec's latest version of WinFax is the first such program that can send faxes through your Internet connection, as opposed to sending them directly to a fax number. $99 street; 800/441-7234, www.symantec.com

READER SERVICE NO. 808

RUNNER-UP: Quarterdeck Procomm Plus 4.0

Personal Information/ Contact Manager
Lotus Organizer 97

Our judges picked Lotus Development's PIM as the program most likely to keep them from forgetting important dates, names, and events. New in Organizer 97: the ability to link or embed OLE objects, such as word processing files and Web addresses, in an Organizer file. $79 list; 800/343-5414, www.lotus.com

READER SERVICE NO. 809

RUNNER-UP: Microsoft Outlook 97

Utility Collection
Symantec Norton Utilities 2.0

Here's the cure for what ails your machine. The latest version of Symantec's system-maintenance and data-recovery software lets you customize a Windows 95 PC without having to visit the dreaded Windows Registry. $79 street; 800/441-7234, www.symantec.com

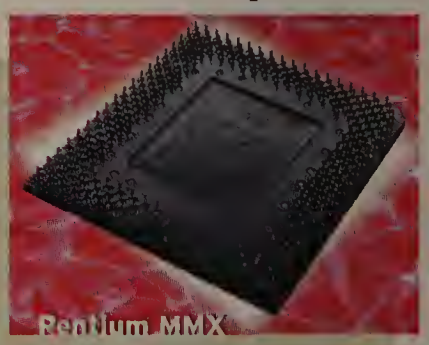
READER SERVICE NO. 810

RUNNER-UP: PowerQuest PartitionMagic 3.0

Antivirus Utility
Symantec Norton AntiVirus 2.0 for Windows 95

Symantec's Norton AntiVirus kills bugs before they become destructive. The latest version includes a helpful wizard

Newcomers of the Year



It wasn't enough for **Intel's Pentium MMX** to get the Product of the Year award; our judges also named the multimedia-enhanced line of processors Most Promising Hardware Newcomer. But if you've recently bought a PC with a non-MMX chip inside, don't worry about the parade passing you by yet again. Intel recently released Pentium OverDrive processors ($399 and $499 list, depending on clock speed) that will let you upgrade 75-, 90-, and 100-MHz Pentium PCs to include MMX technology.

Had it not been for the MMX chip, runner-up **Microsoft Office 97** would have been crowned Product of the Year. But don't feel sorry for the wizards of Redmond: In addition to being judged Best Application Suite this year, Microsoft Office 97 also copped the Most Promising Software Newcomer award over a formidable competitor, Netscape Navigator 4.0.

that walks you through the repair process. Best of all, the new package makes it easy for you to exterminate critters that try to sneak in through the Internet. $70 street; 800/441-7234, www.symantec.com

READER SERVICE NO. 811

RUNNER-UP: McAfee VirusScan

Backup Utility

HP Colorado Background for Windows 95 by Cheyenne

Hewlett-Packard's backup utility, shipped with all HP Colorado tape drives, gets a slap on the back for its ability to perform full or incremental backups automatically any time you like. Free with Colorado tape drives; 800/810-0133, www.hp.com

CorelDraw

READER SERVICE NO. 812

RUNNER-UP: Iomega One-Step

Accounting

Intuit QuickBooks Pro 5.0

With Intuit's QuickBooks Pro, you don't have to think, talk, act, dress, eat, dance, or even look like an accountant to balance your business's books. $199 street; 800/446-8848, www.intuit.com

RUNNER-UP: Peachtree Accounting

Desktop Publishing

Adobe PageMaker 6.5

PageMaker: It's not just for paper anymore. The latest version of Adobe's desktop publishing veteran (and World Class regular) has great tools for designing and publishing Web sites, as well as generating PDF (Adobe Acrobat) files. $549 street; 800/422-3623, www.adobe.com

READER SERVICE NO. 813

RUNNER-UP: Microsoft Publisher 97

Presentation Graphics

Microsoft PowerPoint 97

The judges certainly got their point across in this category: Microsoft's PowerPoint came away with a commanding lead. The 97 version lets you create 3-D effects and generate multiple slides tailored for different audiences, using the same file. $339 street; 800/426-9400, www.microsoft.com

Lotus Organizer

READER SERVICE NO. 814

RUNNER-UP: Corel Presentations 7

Draw

CorelDraw 7

The outcome in this category was hardly a draw: Corel's graphics program wins again, and by a big margin. The latest version adds photo editing, 3-D modeling and rendering, and improved performance. $450 street; 800/772-6735, www.corel.com

READER SERVICE NO. 815

RUNNER-UP: Adobe Illustrator 4.1

Business Graphics

Visio 4.0

Show, don't tell—that's one of many unwritten rules in the business world. Thankfully, business types with no art experience can quickly whip up org charts, floor plans, and other image-intensive documents using Visio's drag-and-drop graphical object library. $140 street; 800/248-4746, www.visio.com

READER SERVICE NO. 816

RUNNER-UP: CorelFlow 3

Computer-Aided Design

Autodesk AutoCAD Release 13

Apparently, the number 13 is good luck for AutoCAD, because that version of the program wins this category for the second time in two years. $3750 list; 800/964-64323, www.autodesk.com

READER SERVICE NO. 817

RUNNER-UP: Corel CAD

Norton AntiVirus

3-D Graphics

Fractal Design Ray Dream Designer 4.2

According to our judges, Fractal Design's 3-D graphics package is dreamy. It stands out for its low price as well as its support for Microsoft's Direct3D and Apple's QuickDraw 3D. $99 list; 800/846-0111, www.fractal.com

READER SERVICE NO. 818

RUNNER-UP: Caligari trueSpace3

Image Editing/Paint

Adobe Photoshop 4.0

Adobe's Photoshop so dominates the field of photo editing that its name has become a verb. Example: A reader we know recently came upon a picture of veteran model Lauren Hutton in a fashion magazine. "She can't still be that young," the reader said. "They must have Photoshopped her face." $550 street; 800/422-3623, www.adobe.com

READER SERVICE NO. 819

RUNNER-UP: Corel PhotoPaint 7.0

Forms

Caere OmniForm 2.0 for Windows 3.1/95

Caere's OmniForm easily wins this category, thanks to the program's ability to quickly scan existing forms and create new ones with built-in database integration, spell-checking, and spreadsheet-style calculations. $120 street; 800/535-7226, www.caere.com

READER SERVICE NO. 820

RUNNER-UP: JetForm BizForms

OCR

Caere OmniPage Pro 7.0 for Windows 95

Caere's OmniPage—last year's OCR World Class champ—is back. $530 street; 800/535-7226, www.caere.com

READER SERVICE NO. 821

RUNNER-UP: Xerox TextBridge Pro 96 ▶

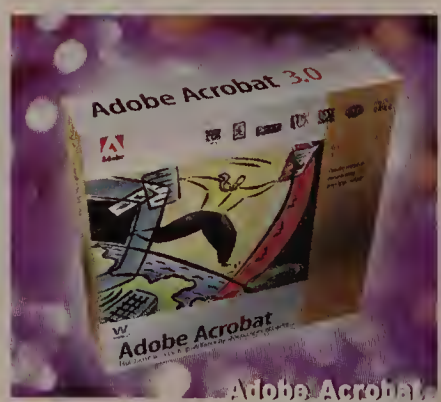
Work Together

Network Server
Compaq ProLiant line
Compaq's line of ProLiant workgroup servers continues to get raves for expandability, streamlined design, hot-swappable drives, and server management software. $2799 to $10,995 list; 800/345-1518, www.compaq.com
READER SERVICE NO. 822
RUNNER-UP: Hewlett-Packard NetServer line

Workgroup Color Printer
HP Color LaserJet 5M
Hewlett-Packard's Color LaserJet 5M earns the top spot for its fast speed, crisp text, and rich color. $5199 street; 800/752-0900, www.hp.com
READER SERVICE NO. 823
RUNNER-UP: Hewlett-Packard DeskJet 1600CM

Workgroup Monochrome Printer
HP LaserJet 5M
When it comes to printers, the Hewlett-Packard brand name is nothing short of catnip. The LaserJet 5M intoxicated our experts with its sharp print quality, easy-to-use control panel, and built-in ethernet support. $1799 street; 800/752-0900, www.hp.com
READER SERVICE NO. 824
RUNNER-UP: Hewlett-Packard LaserJet 5Si

LAN Operating System
Microsoft Windows NT Server 4.0
NT Server 4.0's Win 95–like interface helped it overtake



Novell NetWare in our annual battle of the network stars. NT 4.0's support for Peer Web Services didn't hurt, either. (PWS is a subset of Microsoft Internet Information Server, which lets desktop users publish Web pages on corporate intranets without a dedicated Web server.). $319 list; 800/426-9400, www.microsoft.com
READER SERVICE NO. 825
RUNNER-UP: Novell NetWare 4.11

Application Environment
Lotus Notes 4.5
As they did last year, our judges found few groupware apps in a class with Lotus's Notes. Version 4.5 offers an even tighter fit with Windows NT and Microsoft Exchange, plus the ability to forward Web pages to coworkers. Starter kit $1249 street; 800/575-6887, www.lotus.com
READER SERVICE NO. 826
RUNNER-UP: Microsoft Exchange Server 4.1 for NT

Group Discussion
Lotus Notes 4.5
Version 4.5's tighter integration with Windows NT and the ability to forward Web pages to colleagues certainly help Notes keep its hold on this category. Starter kit $1249 street; 800/828-7086, www.lotus.com
READER SERVICE NO. 826
RUNNER-UP: AttachMate OpenMind 3.0 for Windows NT

Document/Videoconferencing
Microsoft NetMeeting 2.0
Microsoft's real-time communications tool sent last year's winner, Intel ProShare Video Conferencing System 200, packing. This new version, a free download, lets Windows 95 and NT users reach out and see each other over the Net. You can use it to communicate with anyone else using a videoconferencing program that supports the H.323 standard. Free download; www.microsoft.com/netmeeting
READER SERVICE NO. 827
RUNNER-UP: Intel ProShare Video Conferencing System 200 2.0

Electronic Document Distribution
Adobe Acrobat 3.0
Last year's winner has matured from a popular electronic document program into a required tool in practically every Webmaster's kit. Single-user license $295 list, ten-user license $1595 list; 800/272-3623, www.adobe.com
READER SERVICE NO. 828
RUNNER-UP: Common Ground 2.0

Project Manager
Microsoft Project 95
Getting your act together is a breeze with Microsoft's Project 95. It gets overwhelming applause from our experts for its ease of use and powerful scheduling and task management tools. $469 street; 800/426-9400, www.microsoft.com
READER SERVICE NO. 829
RUNNER-UP: Primavera SureTrak Project Manager 1.5 ▶

METHODOLOGY Last February we mailed World Class ballots to 2000 selected *PC World* subscribers, computer professionals, and user group members, asking them to vote for the top products in 84 categories. The products listed on the ballot were nominated by *PC World* editors, with the exception of CD-ROMs, Business Web Site, Recreational Web Site, and Loser of the Year, which were exclusively write-in candidates. Our thanks to our sister publication *InfoWorld* for supplying the list of computer professionals, and to Pete Grant at User Group Connection for providing access to user groups.

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Introducing TeleVideo's SuperView Series™ and Super-View Pro Series™. A complete line of feature rich color monitors – WebOptimized for your comfort and reliability. Our finely crafted monitors have the highest horizontal frequency up to 107KHz, a dot pitch as fine as 0.26mm, flicker-free refresh rates, digitized on-screen controls with memory recall and more. The spectacular specifications of our monitors allow you to comfortably enjoy razor-sharp images and exquisite shapes with optimum brilliance and vivid detail. As a leader in display technology for over two decades, we know how to optimize our monitors to make them ideal for the Web. Now you can enjoy the ever-evolving digital world of the Internet, DVD, desk-top publishing, high-end CAD and more. Break through all your conceptual horizons with TeleVideo.

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15" Models	Dot Pitch (mm)	Max. Res. (HxV)	H-Scan (KHz)	ERP ($)
TeleVideo SV100	**0.28**	**1280x1024**	**30-70**	**349**
PanaSync E15	0.27	1024x768	30-61	399
Mag InnoVision DX1595	0.28	1280x1024	30-65	429
Viewsonic 15GS	0.28	1280x1024	30-69	429

17" Models	Dot Pitch (mm)	Max. Res. (HxV)	H-Scan (KHz)	ERP ($)
TeleVideo SV210	**0.26**	**1280x1024**	**30-70**	**568**
NEC XV17+	0.28	1280x1024	31-65	850
PanaSync S17	0.27	1280x1024	30-69	799
ViewSonic 17GS	0.27	1280x1024	30-69	699

21" Models	Dot Pitch (mm)	Max. Res. (HxV)	H-Scan (KHz)	ERP ($)
TeleVideo SVP350	**0.28AG**	**1600x1200**	**30-107**	**1889**
NEC P1150	0.28AG	1600x1200	31-94	2079
Sony CPD300SF	0.30AG	1600x1200	30-85	1999
ViewSonic PT810	0.30AG	1600x1200	30-96	1899

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IBM ThinkPad 760

On the Road

Power Notebook
IBM ThinkPad 760
Big Blue is white-hot with its sleek black notebooks. The ThinkPad 760's big screen and generous features prove that it's possible to have style *and* substance. $2400 to $5400 list; 800/426-2968, www.pc.ibm.com
RUNNER-UP: Toshiba Tecra 730CDT

U.S. Robotics PalmPilot

Budget Notebook
Toshiba Satellite Pro line
High-end features and low-cost design make Toshiba's Satellite Pro line a winner for taking multimedia on the road. $2100 to $3400 list; 800/457-7777, www.computers.toshiba.com
READER SERVICE NO. 830
RUNNER-UP: Gateway 2000 Solo 2100 P120

Personal Digital Assistant
U.S. Robotics PalmPilot
Agent 007 would feel at home with U.S. Robotics' PalmPilot—a cool, versatile palmtop with built-in organizer tools and the ability to synchronize files with a PC. Best of all, this pen-based gadget fits easily into a trench coat pocket, right next to that laser stun gun. Professional Edition $399 list, Personal Edition $299 list; 800/527-8677, www.usr.com
READER SERVICE NO. 831
RUNNER-UP: Casio Cassiopeia

Wireless Communications Device
Motorola PageWriter
Paging became a two-way street when Motorola introduced its PageWriter last fall. With the help of its built-in QWERTY keyboard and display, you can now send as well as receive text messages anywhere—from an office to a beach blanket. $399 list; 817/548-9954, www.mot.com
READER SERVICE NO. 832
RUNNER-UP: Megahertz All-Points Card

PC Card Modem
U.S. Robotics Sportster PC Card
The Sportster is the clear winner in this slot, disconnecting last year's victor, the Hayes Optima. A free downloadable software upgrade from U.S. Robotics' Web site brings this PC Card modem up to a full 33.6 kbps—perfect for mobile PC users hooked on speed. $179.95 list; 800/527-8677, www.usr.com
READER SERVICE NO. 833
RUNNER-UP: Megahertz XJ4336

Removable Media/ Portable Drive
Iomega Zip
Despite increasing competition, Iomega's portable, affordable Zip drive remains the most popular choice. The Zip's inexpensive, floppy disk–size cartridges are ideal for backing up on the road or playing sneakernet in the office. $150 street; 800/697-8833, www.iomega.com
READER SERVICE NO. 834
RUNNER-UP: Iomega Jaz

Remote Access/ Remote Control Software
Symantec pcAnywhere32 7.5
pcAnywhere32 is the program of choice for those who need to access or control a remote PC. The latest version of Symantec's package provides expanded Internet connection capabilities and support for ISDN and infrared links. Host and remote two-user package $149 list; 800/441-7234, www.symantec.com
READER SERVICE NO. 835
RUNNER-UP: Traveling Software LapLink 7.5 ▶

Motorola PageWriter

Loser of the Year

Here's a metaphysical question to ponder: Is **America Online** the service we love to hate—or the service we hate to love?

Either way you look at it, our World Class judges are definitely of two minds when it comes to "America Offline"—winner of our dubious Loser of the Year award as well as recipient of our Best Online Service honors. On the plus side, AOL's colorful interface makes it easy to navigate; it offers more information than you could ever digest; and now, for $19.95 a month, you get unlimited access to both AOL's content and the entire Internet. What more could you want?

Well, let's see. How about reliability? Since it started offering flat-rate monthly service in December 1996, AOL has been frantically trying—and often failing—to keep up with demand, resulting in service overloads that can last hours. Angry customers unable to make or keep a connection filed suit, demanding refunds.

Clearly, AOL's reputation has taken a beating. The good news is that the company is spending $350 million to expand its network, personnel, and facilities, and holding the subscriber base to its current levels. If all goes well, next year we won't be able to kick AOL around anymore.

Finally, a color laser printer loaded with features, starting at $3500.

The Xerox DocuPrint C55 Network Color Laser Printer.

A different line of thinking.

A breakthrough price, a surprisingly small footprint, and ingenious new features for the networked office.

Now you can afford the quality and speed of color laser technology along with breakthrough convenience features that save time and effort.

The Adobe® PostScript® option includes exclusive features like Fax Friendly Black that converts color to patterns of black and white so they're readable when faxed. ImageFix enhances imperfect photos.

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6 ppm fast blue
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600 dpi
(Less than 10¢ per page, full color.)

And Fast Blue prints quick drafts in shades of blue and black.

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So, for an exceptional value in color laser printing, think differently. Call for product literature and print samples. 1-800-34-XEROX ext. 2961. In Canada, 1-800-ASK-XEROX ext. 2961. Or stop by http://xerox.networkprinters.com and see our powerful new line of network laser printers.

THE DOCUMENT COMPANY

XEROX

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Stated price is the estimated U.S. street price for the base model.

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NEW SOUND Generation

A Complete Speaker System for MULTIMEDIA & DVD

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- Compatible with CD-ROM, DVD, TV-tuner and Video Game Systems
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- High Quality with an Incredible Price

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layer with primary color filters. Thus, shadow mask technology advances to a whole new level, surpassing even the aperture grill technique. Moving images are clear and bright; text is sharp and readable. In other words, MICROFILTER technology realizes the full visual potential of multimedia. Break through to a new level of brightness and contrast. The Toshiba MICROFILTER CRT.

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http://www.toshiba.com/taec

In Touch with Tomorrow

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Circle 234 on reader service card

Canon PowerShot 600

@Home

Home Desktop Computer
Gateway 2000 Family PC line
Gateway's aggressively priced PCs are built to spec with an enticing array of features and 24-hour tech support. To that, our judges say, "Cowabunga!" $1599 to $2869 list; 800/846-2000, www.gw2k.com
READER SERVICE NO. 836
RUNNER-UP: Dell Dimension line

Personal Color Printer
HP DeskJet 820 line
Talk about color—our judges were tickled pink with this Hewlett-Packard line. $400 street; 800/810-0133, www.hp.com
READER SERVICE NO. 837
RUNNER-UP: Epson Stylus Color 500

Personal Monochrome Printer
HP LaserJet 6P/6MP
The 6P and 6MP raise the bar on last year's winners, Hewlett-Packard's LaserJet 5 and 5M models, by delivering 8-ppm print speeds and enhanced graphics features. 6P $799 street, 6MP $950 street; 800/810-0133, www.hp.com
READER SERVICE NO. 838
RUNNER-UP: Hewlett-Packard LaserJet 5L Xtra

Digital Camera
Canon PowerShot 600
Picture this: Canon's digital camera captures images that are almost as rich and detailed as their film equivalents. $799 street; 800/848-4123, www.ccsi.canon.com
READER SERVICE NO. 839
RUNNER-UP: Epson Photo PC

Personal Finance
Intuit Quicken Deluxe 6
Here's another one for the "no wonder Microsoft tried to buy Intuit" file. Nearly 90 percent of our judges picked Intuit's Quicken in this category. $60 street; 800/446-8848, www.intuit.com
RUNNER-UP: Microsoft Money 97

Tax Planning/Preparation
Intuit TurboTax Deluxe
There are only three certainties in life: death, taxes, and Intuit's hammerlock on this category. TurboTax Deluxe's video clips and planner can take away a lot of tax-time pain. But as for that first certainty we mentioned, you're on your own, kid. $50 street; 800/816-8025, www.intuit.com
RUNNER-UP: Parsons Personal TaxEdge

Personal Database
Microsoft Access 97
With this version of Microsoft's database application, you can embed hyperlinks to Web sites within text labels, pictures, buttons, forms, and reports. $339 street; 800/426-9400, www.microsoft.com
READER SERVICE NO. 840
RUNNER-UP: Lotus Approach 97

Shareware/Freeware
McAfee VirusScan
Working in the background, McAfee's VirusScan does a search and destroy of all nasty gremlins it finds. Free trial for 30 days, registered version $65 list; 408/988-3832, www.mcafee.com
READER SERVICE NO. 841
RUNNER-UP: Microsoft Power Toys for Windows 95

CD-ROM: Reference
Microsoft Encarta 97
Microsoft's perennial World Class winner now has longer video clips and free monthly Web updates in its Deluxe version. Deluxe edition $65 street, Standard edition $55 street; 800/426-9400, www.microsoft.com
READER SERVICE NO. 842
RUNNER-UP: Microsoft Bookshelf 1996-97 Edition

CD-ROM: Entertainment
Microsoft Flight Simulator
Microsoft's Flight Simulator has soared to the top for over 15 years. $50 street; 800/426-9400, www.microsoft.com

Duke Nukem and friends

READER SERVICE NO. 843
RUNNER-UP: Berkeley Systems You Don't Know Jack

CD-ROM: Adult Game
Duke Nukem 3D
Murderous aliens have landed in Los Angeles. Blast 'em! $39.95 list; Apogee, 800/337-3256, www.3drealms.com
READER SERVICE NO. 844
RUNNER-UP: Brøderbund Myst

CD-ROM: Children's Game
Where in the USA is Carmen Sandiego?
Ms. Sandiego's trips are a clever way to teach kids geography. $34 street; Brøderbund Software, 800/521-6263, www.broderbund.com
READER SERVICE NO. 845
RUNNER-UP: Maxis SimCity 2000

Intuit Quicken Deluxe

CD-ROM: Adult Education and Training
Mavis Beacon Teaches Typing 5.0
Ms. Beacon's engaging games can teach anyone to type. $40 street; Mindscape, 800/234-3088, www.mavisbeacon.com
READER SERVICE NO. 846
RUNNER-UP: Asymetrix ToolBook II

CD-ROM: Children's Education
JumpStart series
Brain teasers, music, and other age-appropriate activities give young children an educational boost. $35 street per disc; Knowledge Adventure, 800/542-4240, www.adventure.com
READER SERVICE NO. 847
RUNNER-UP: Learning Company Reader Rabbit ▶

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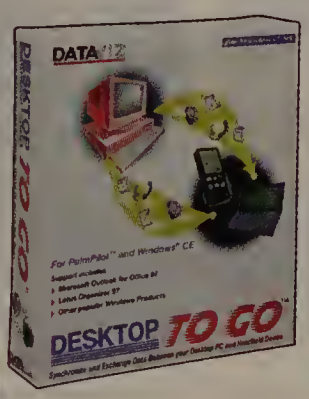
In addition to providing synchronous capabilities for Windows CE, Desktop To Go provides word processing and spreadsheet translators for Pocket Word and Pocket Excel, so various Windows-based documents can be converted between the two platforms while retaining their original formatting, including bold, *italics,* embedded graphics and more.



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America Online
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READER SERVICE NO. 848
RUNNER-UP: CompuServe

Internet Service Provider
AT&T WorldNet Service
Aside from the fact that WorldNet's sign-up software is being preloaded onto many new PCs, AT&T's service also gets high marks for reliable connections. $19.95 per month unlimited access; 800/967-5363, www.att.com/worldnet
READER SERVICE NO. 849
RUNNER-UP: Netcom

E-Mail Software
Netscape Mail
Netscape Navigator's built-in e-mail feature gets the prize for convenience—you can send and receive messages without switching to another app. $49 list for Navigator; 800/638-7483, www.netscape.com
READER SERVICE NO. 850
RUNNER-UP: Qualcomm Eudora Pro 3.0

Web Browser
Netscape Navigator 3.0
Browser wars? What browser wars? When it came to Web surfing, our judges clicked with Netscape's Navigator. $49 list; 800/638-7483, www.netscape.com
READER SERVICE NO. 850
RUNNER-UP: Microsoft Internet Explorer 3.0

Browser Plug-In
Adobe Acrobat Reader 3.0
Working closely with Web browsers, Adobe's plug-in lets you view an Acrobat document one page at a time without downloading the entire file. Free download; www.adobe.com
READER SERVICE NO. 851
RUNNER-UP (TIE): Macromedia

Microsoft FrontPage

Shockwave, Progressive Networks Real Audio 3.0

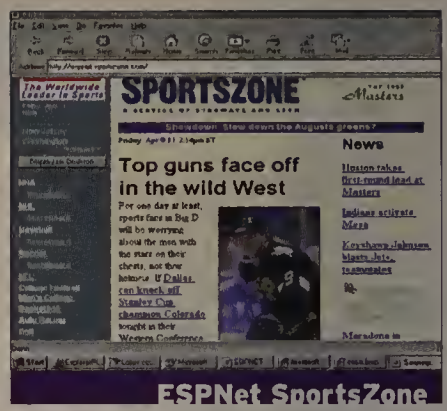
Offline Browser/Search Tool
Symantec Internet FastFind
A friendly interface and the ability to query multiple search engines at once make this Symantec tool a winner. $50 street; 800/441-7234, www.symantec.com
READER SERVICE NO. 852
RUNNER-UP: Forte Free Agent 1.0

Internet Utility
Pretty Good Privacy 2.6
This high-security encryption tool thwarts would-be snoops by scrambling e-mail so only intended recipients can read it. Free download; web.mit.edu/network/pgp.html
RUNNER-UP: Starfish Internet Utilities

News/Information Services
PointCast Network 1.1
PointCast, the epitome of the hot new "push" technology, broadcasts news headlines, stock quotes, weather, and sports onto your PC. Free download; www.pointcast.com
RUNNER-UP: My Yahoo

Web Search Site
AltaVista (www.altavista.digital.com)
Yahoo (www.yahoo.com)
AltaVista is a no-nonsense site for performing both simple and advanced searches, while Yahoo is a cheeky Web catalog.
RUNNER-UP: Excite

Business Web Site
Microsoft.com (www.microsoft.com)
Where do you want to go for the latest software patches, drivers, updates, tips, and news about all of those Microsoft programs you use? The Microsoft Web site, natch.
RUNNER-UP: CNN.com



ESPNet SportsZone

Recreational Web Site
ESPNet SportsZone (espnet.sportszone.com)
ESPN, the cable sports channel, scores a home run for its Web venture.
RUNNER-UP: Yahoo

Web Authoring Tool
Microsoft FrontPage 97
Learning HTML to create a Web site has made otherwise pleasant people cranky. Microsoft's FrontPage 97 lets you drag, drop, and click a site into reality—without knowing any HTML. $149 street; 800/426-9400, www.microsoft.com
READER SERVICE NO. 862
RUNNER-UP: Netscape Navigator

Service & Support

Software Support
Microsoft
By offering extensive, searchable help libraries within its software applications, plus a toll-free tips line, a download service on the Internet, and quick response on its help lines, Microsoft gets top honors for its support services.
RUNNER-UP: Intuit

Hardware Support
Dell Computer, Gateway 2000
Practically every month, Dell and Gateway PCs make our Top 20 Power and Budget Desktops lists, thanks in no small part to the companies' superb technical support policies. Both offer toll-free technical support 24 hours a day, seven days a week, and both provide a three-year warranty on parts.
RUNNER-UP: Hewlett-Packard

Mail-Order Service
PC Connection
Combining wide product selection with speedy, low-cost service, PC Connection has become a perpetual World Class winner. 800/800-0004, www.pcconnection.com
RUNNER-UP: PC Direct

James A. Martin is a contributing editor for PC World. ■

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MMX™ intel inside pentium® II PROCESSOR

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PC World 5/97

"With a PC WorldBench score of 230, this minitower is one of the fastest (200MHz Pentium® processor-based) system we've seen."

performance for less.

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Conforming to the K56flex™ standard that has been endorsed by more than 400 leading high-tech companies, you'll be surfing the Internet up to twice as fast as with most modems.

Where video CD and high-capacity CD-ROM converge. DVD will turn your PC into a home theater experience by providing superb quality audio and video. MPEG-2 compression and Dolby ProLogic Surround Sound are the backbone behind the experience.

Finally, true plug & play. No more IRQ or COM port conflicts when it comes to connecting hardware. Two USB ports come standard on most Quantex systems so you can take advantage of the new, hot USB peripherals.

Top Power Bargain

PC World 6/97

"The Quantex QP6/266 SM-4x will make power-hungry buyers think they have died and gone to heaven."

QP6/266 SM-4x

(featuring the Pentium® II Processor)

$2999 Business lease:$ 105/Mo.

- 266MHz Pentium® II Processor
- 2 Universal Serial Bus (USB) Ports
- 64MB EDD Memory /512KB Secondary Cache
- 6.4GB EIDE Mode 4 HD / 3.5" 1.44MB Floppy Drive
- Matrox Millennium 3D w/4MB WRAM
- 17" Digital Monitor (16.1" viewable)
- K56flex™ protocol Fax/Modem w/Voice Mail and Speakerphone
- Toshiba 16X Max 95ms EIDE CD-RDM Drive
- Midi Wavetable Stereo Sound
- Altec Lansing ACS-45 Speakers w/subwoofer
- ATX Case
- 104-Key Keyboard with MS IntelliMouse
- MS Windows '95 with MS Plus
- NEW! ▶ MS Office 97 Small Business Edition
- 3-year limited warranty, 24-hr./7-day Technical Support

QP5/233 SM-4 (with MMX Technology).....$2799
QP6/200 SM-4 (with Pentium® Pro processor)...$2699
QP6/233 SM-4x(featuring Pentium II processor)..$2899

DVD Upgrade Package

- Toshiba DVD RDM (upgrade from 16X Max CD-ROM)
- DVD Decoder Board
- Altec Lansing ACS-500 Speakers w/ ACS-250 subwoofer (upgrade from ACS-400 Speakers)

Add $569

C Computing 4/97

The best priced MMX(™ technology) machine you'll d - and it's loaded with extras."

inner of ★★★★★ *rating.*

Home PC 6/97

"Quantex has a reputation for delivering computers that pack a punch, and the QP5/200 SM-3 with MMX™ (technology) is no exception."

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- 64MB EDO Memory / 512KB Secondary Cache
- 6.4GB EIDE Mode 4 HD / 3.5" 1.44MB Floppy Drive
- Matrox Millennium 3D w/4MB WRAM
- 17" Digital Monitor (16.1" viewable)
- K56flex™ protocol Fax/Modem w/Voice Mail and Speakerphone
- Toshiba 16X Max 95ms EIDE CD-ROM Drive
- Midi Wavetable Stereo Sound
- Altec Lansing ACS-45 Speakers w/subwoofer
- ATX Case
- 104-Key Keyboard With MS IntelliMouse
- MS Windows '95 With MS Plus

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QP5/233 SM-4 (with MMX Technology).....$2799
QP6/200 SM-4 (with Pentium® Pro Processor*)....$2699
QP6/233 SM-4x (featuring Pentium® II Processor)...$2899

Being the first to market with the latest products and technologies may seem like no big deal. But it is. By purchasing a PC with the most up-to-date products, you will significantly extend the life of your PC and of your hard-earned investment. Check out what Quantex is first to market with this month:

The Pentium® II processor Delivers a Performance Punch

Quantex systems powered by the Pentium II processor deliver the horsepower you need for realistic graphics, full-screen, full-motion video, enhanced color and more. At clock speeds up to 266MHz, the Pentium II processor has the performance for today's and tomorrow's software. It's your best choice for both integer performance for productivity and floating point performance for compelling 3D graphics.

MMX™ intel inside pentium® PROCESSOR

Did You Know ?

Quantex PC's consistently offer top-notch performance and usability.

Along with many other awards, Quantex was recently awarded PC Computing's coveted "★★★★" 4-star rating in both May and June, 1997!

UPGRADES (available with system purchase)

- Special DVD Upgrade ..... See Below
- Panasonic PD/CD-Rom Drive w/ one 650MB PD cartridge.. $279
- Three(3) Panasonic PD cartridges $99
- APC Back UPS Office (price reflects $30 manuf. rebate)... $169
- 3Com 3c905 PCI NIC $89
- Motorola ISDN Terminal Adapter $189
- Microsoft Natural Keyboard (upgrade from 104-keyboard) .. $39
- Microsoft Sidewinder 3D Pro Joystick $59
- HP Deskjet 692C Printer (w/ photo color kit) $299
- HP Laserjet 5L-FS Printer $399

(all upgrades are covered by manufacturer's warranty)

Surf the Web at two times the speed

Utilizing the most widely-accepted standard, K56flex™ adopted by over 400 leading high-tech companies, your days of patiently waiting for files to download are over. K56flex technology was specifically created to allow you to download as much information as quickly as possible.

Hop on the Newest PC Bus

Say goodbye to IRQ and COM port conflicts when adding hardware. Most Quantex systems now come standard with two Universal Serial Bus ports so you can take advantage of the newest USB peripherals like digital cameras, joysticks and more.

DVD - A Whole New World

You've read all the hype, but now it's really here. Quantex is proud to be among the first to offer this revolution in CD technology. DVD (Digital Video Disk) technology offers unsurpassed video and outstanding audio, Add to that an enormous 4.7GB storage capacity. Experience movies and multimedia in a whole new way.

DVD Upgrade Package:

- Toshiba® DVD ROM (upgrade from 16X Max CD-ROM)
- DVD Decoder Board
- Altec Lansing ACS-500 Speakers w/ACS-250 subwoofer (upgrade from speakers in system purchase)

Your system purchase:	SM-1 or SM-2	SM-3 or SM-4
DVD Upgrade Package Cost:	$599	$569

MS OFFICE 97 SMALL BUSINESS EDITION

- Word 97 ■ Excel 97 ■ Outlook 97 ■ Publisher 97
- AutoMap Streets ■ Small Business Financial Manager

Power Multimedia Series

QP5/166 SM-1 (with MMX™ Technology) $1799

Business lease: $63/Mo.

- 166MHz Pentium® Processor with MMX™ Technology
- 2 Universal Serial Bus (USB) Ports
- 32MB EDO Memory / 512KB Pipelined Burst Cache
- 3.2GB EIDE Mode 4 HD / 3.5" 1.44MB Floppy Drive
- Matrox Mystique 220 3D w/4MB SGRAM (Free 3D game included!)
- 15" Digital Monitor (14.0" viewable)
- K56flex™ protocol Fax/Modem w/Voice Mail and Speakerphone
- Toshiba 16X Max 95ms EIDE CD-RDM Drive
- Midi Wavetable Stereo Sound
- Altec Lansing ACS-90 Speakers
- Mid-Tower Case
- 104-Key Keyboard With MS IntelliMouse
- MS Windows® '95 With MS Plus

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- 3-year limited warranty, 24-hr./7-day Technical Support

QP5/200 SM-1 (with MMX Technology)..... $1999
QP6/200 SM-1 (with Pentium® Pro Processor*).... $2099

QP6/200 SM-2 $2199

Business lease: $77/Mo.

- 200MHz Pentium® Pro Processor
- 2 Universal Serial Bus (USB) Ports
- 32MB EDO Memory /256KB Internal L2 Cache
- 3.2GB EIDE Mode 4 HD / 3.5" 1.44MB Floppy Drive
- Matrox Mystique 220 3D w/4MB SGRAM (Free 3D game included!)
- 17" Digital Monitor (16.1" viewable)
- K56flex™ protocol Fax/Modem w/Voice Mail and Speakerphone
- Toshiba 16X Max 95ms EIDE CD-ROM Drive
- Midi Wavetable Stereo Sound
- Altec Lansing ACS-90 Speakers
- ATX Case
- 104-Key Keyboard With MS IntelliMouse
- MS Windows '95 With MS Plus

NEW! ▶ MS Office 97 Small Business Edition

- 3-year limited warranty, 24-hr./7-day Technical Support

QP5/233 SM-2 (with MMX Technology)..... $2299
QP6/233 SM-2x (featuring Pentium® II Processor)...$2399

Best Value!

QP6/233 SM-3x (featuring Pentium® II processor) $2499

Business lease: $87Mo.

- 233MHz Pentium II Processor
- 2 Universal Serial Bus (USB) Ports
- 32MB EDO Memory /512KB Secondary Cache
- 4GB EIDE Mode 4 HD / 3.5" 1.44MB Floppy Drive
- Matrox Millennium 3D w/4MB WRAM
- 17" Digital Monitor (16.1" viewable)
- K56flex™ protocol Fax/Modem w/Voice Mail and Speakerphone
- Toshiba 16X Max 95ms EIDE CD-RDM Drive
- Midi Wavetable Stereo Sound
- Altec Lansing ACS-45 Speakers w/subwoofer
- ATX Case
- 104-Key Keyboard With MS IntelliMouse
- MS Windows '95 With MS Plus

NEW! ▶ MS Office 97 Small Business Edition

- 3-year limited warranty, 24-hr./7-day Technical Support

QP5/233 SM-3 (with MMX Technology)..... $2449
QP6/200 SM-3 (with Pentium Pro Processor*)..... $2349
QP6/266 SM-3x (featuring Pentium II Processor)..... $2699

*(includes 256KB Internal L2 Cache)

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Featuring the Pentium® II Processor

Intel's latest Pentium II Processor was engineered specifically for high-performance desktops, workstations and servers. You'll get the best performance available for 32-bit apps running on advanced operating systems. Integrated 512MB cache makes it the right choice for power workstations.

QP5/120 WS-1

$1249 Business lease: $ 44/Mo.

- 120MHz Pentium® Processor
- 16MB EDO Memory/512KB Pipelined Burst Cache
- 1.2GB EIDE Mode 4 HD/3.5" 1.44MB Floppy Drive
- 64-bit PCI 3D w/2MB
- 15" Digital Monitor (14.0" viewable)
- 3Com 3c509 ISA Combo NIC
- Toshiba 12X 125ms EIDE CD-ROM Drive
- Mini-Tower Case
- 104-Key Keyboard With MS PS/2 Mouse
- MS Windows '95 With MS Plus
- 3-year limited warranty, 24-hr./7-day Technical Support

QP5/133 WS-1.....$1279
QP5/166 WS-1.....$1349
QP5/166 WS-1.....$1399
(with MMX™ Technology)

QP6/266 WS-4x
(featuring Pentium® II processor)

$3499 Business lease: $ 113/Mo.

- 266MHz Pentium® II Processor
- 64MB EDO Memory/512KB Secondary Cache
- 4GB Ultra Wide SCSI HD / 3.5" 1.44MB Floppy Drive
- Adaptec 2940UW PCI Ultra Wide SCSI Controller
- Matrox Millennium 3D w/4MB WRAM
- 17" Digital Monitor (16.1" viewable)
- 3Com 3C905 PCI 10/100 NIC
- Toshiba 12X 115ms SCSI CD-ROM Drive
- ATX Case
- 104-Key Keyboard With MS PS/2 Mouse
- MS Windows NT 4.0 Workstation
- 3-year limited warranty, 24-hr./7-day Technical Support

QP5/200 WS-4.....$3049
(with MMX™ Technology)
QP6/200 WS-4.....$3149
(with Pentium Pro Processor - includes 256 Internal L2 Cache)
QP6/233 WS-4x.....$3299
(featuring the Pentium II processor)

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MMX™ intel inside pentium® PROCESSOR

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Canada 1-800-793-4167
Puerto Rico 1-800-793-4185

12X, 16X, 18X

THE *fastest* Drives Alive

PLEXTOR'S 12PleX PX-12CSi SCSI drive (top), Teac's CD-512E EIDE drive (bottom).

DVD may get all the hype, but CD-ROM drives are faster and better than ever. We tested a dozen 12X and faster drives and found two Best Buys worth a spin.

BY ERIK HOLSINGER AND REX FARRANCE

REPORTS OF THE TRUSTY CD-ROM DRIVE'S demise have been greatly exaggerated—this year, anyway. Its sexy successor, the DVD-ROM drive, is only just beginning to appear on store shelves after being waylaid by industry fights over specifications. Eventually, DVD-ROM drives will replace CD-ROM drives. DVD-ROMs hold a lot more, and they make everything from movies to action-adventure games sound better and look better. But until then, companies continue to crank out plenty of ▶

PHOTOGRAPHS BY BIONDO PRODUCTIONS

12X, 16X, and faster CD-ROM drives.

If you want to upgrade your 4X clunker to a faster model now, one of these new CD-ROM drives may be your best choice. At about $100 to $300, they cost much less than the first DVD-ROM drive kits, and they're a lot faster at handling CD-ROM software.

As we went to press, a relative handful of DVD programs and movies were available (more should be out for the holiday buying season). The first TV set-top DVD movie players were in stores, but no finished computer DVD-ROM drives were available in time for review. Instead, we looked at a prototype DVD-ROM drive installed in a Toshiba Infinia Pentium-200 PC. The drive did a fine job of playing DVD-ROM applications (see "DVD-ROM Delivers"). And although the Toshiba drive was slow in completing our CD-ROM benchmarks, it did run CD-ROM apps without problems.

The transition to DVD-ROM won't happen overnight. Bob Katzive, vice president of Disk/Trend, a market research firm in Mountain View, California, confirms that DVD-ROM drives will take a while to catch up. "Last year over 54.5 million CD-ROM drives were sold," he notes. "It will be late 1999 or 2000 before DVD manufacturers match that volume."

For this review, we tested 12 new EIDE and SCSI-2 internal CD-ROM drives with maximum throughput ratings of 12X to 18X. The drives are priced from $105 to $269, not including SCSI cards. We did not test any new 8X or 10X models because they're already being phased out.

As expected, we found that not all the latest CD-ROM drives live up to their speed rating, and that switching to a faster drive doesn't speed up all tasks. But using CD-ROM apps, every drive tested was noticeably quicker than both the prototype DVD-ROM drive and the 4X Mitsumi CRMC FX400E EIDE drive we used for reference. Although the EIDE drives performed well—about 60 percent faster on

Best Buys

IF YOU WANT A QUICK, well-built CD-ROM drive but don't want to spend a lot, the $149 **Teac CD-512E** should be right up your alley. This 12X EIDE model comes in an installation kit with a good instruction manual and drivers and audio CD software for DOS, Windows 3.*x*, and other operating environments that require them. If you need a drive for demanding business use, or if you are just willing to pay what it takes to get the finest, the $269 **Plextor 12PleX PX-12CSi** SCSI unit is your best bet. With Plextor's optional Adaptec AHA-2930 PCI SCSI card ($199 extra), the 12PleX PX-12CSi is the Mercedes-Benz of CD-ROM drives—eminently reliable and ultrafast. With the only two-year warranty here and a superb drive kit, the Plextor is worth every penny.

CD-ROM DRIVES SCORECARD

SCSI-2 INTERNAL DRIVES	Street price (5/11/97) [1]	Vendor speed rating (min./max.)	Comments	Overall value
Plextor 12PleX PX-12CSi 800/886-3935 www.plextor.com	$269 [2]	12X/12X	Superfast business product: strong caddy feed, big buffer; external model $389.	outstanding
Toshiba XM-3801B-S 714/457-0777 www.tais.com/taisdpd	$269	12X/15X	Top performer, but pricey for bare-bones drive with tray feed; external model $365.	very good
Pioneer DR-466 800/444-6784 www.pioneerusa.com	n/a [5]	12X/12X	Sold by third-party vendors; this fast SCSI unit available at some computer outlets.	n/a [6]
EIDE INTERNAL DRIVES				
Teac CD-512E 213/726-0303 www.teac.com	$149	12X/12X	Includes software for playing music CDs on DOS and Windows 3.*x* systems.	outstanding
Toshiba XM-5702B 714/457-0777 www.tais.com/taisdpd	$145	12X/12X	Basic drive is a fine performer for an EIDE product; priced well.	very good
Samsung SCR-1231 800/933-4110 www.sosimple.com	$135	12X/12X	No extras except an audio cable, but good price and performance.	very good
Creative Labs Infra 1800 800/998-5227 www.creativelabs.com	$180	12X/12X	Unique package has infrared remote control, attractive software bundle.	fair
Aztech Zeta 12X 800/886-8859 www.aztechca.com	$105	12X/12X	Outstanding price, but drive is run-of-the-mill and has mediocre performance.	fair
Acer CD616A 800/452-2337 www.acer.com/aac	$159	8X/18X	Disappointing performance from an 8X/18X drive; costs as much as a SCSI unit.	below average
Pioneer DR-444 800/444-6784 www.pioneerusa.com	n/a [5]	12X/12X	Fastest EIDE drive; distributed to computer outlets through third-party vendors.	n/a [6]
Sony CDU-511 16X Max 800/352-7669 www.sony.com/storagebysony	n/a [5]	8X/16X	You'll probably find this nimble EIDE drive installed in some new PCs.	n/a [6]
Wearnes CDD-1620 800/597-4872 www.wpinet.com.sg	n/a [5]	12X/16X	One of the quickest EIDE drives; may be hard to find.	n/a [6]

Best Buy n/a = not available

Arranged by category in order of overall value based on price (20 percent), performance (50 percent), features including software (20 percent), and support (10 percent). Products distributed only through third-party vendors are arranged in alphabetical order.

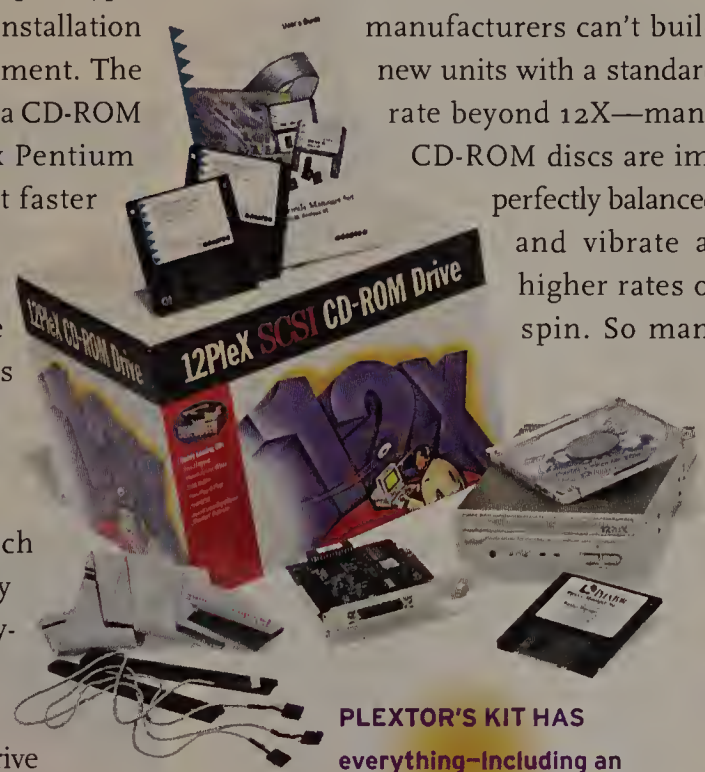
[1] Vendor estimate.
[2] Adaptec AHA-2930 interface card $199.
[3] Toll-free.
[4] Free drivers for operating environments other than Windows 95 and NT available on Web site.

average than the 4X reference drive and 50 percent faster than the DVD-ROM drive—the three SCSI drives were fastest of all. They averaged a heady 90 percent faster than the 4X Mitsumi and 80 percent faster than the DVD-ROM prototype.

File copying and software installation showed the biggest improvement. The SCSI models copied files from a CD-ROM onto our test PC, a Quantex Pentium MMX-166, up to 215 percent faster than the 4X Mitsumi did, while the EIDE drives were up to 180 percent faster. The quickest SCSI and EIDE drives installed the Office 95 suite almost 150 percent faster than the 4X (see Test Report).

If SCSI drives are so much speedier overall, then why would you even consider buying an EIDE drive? Price. An EIDE drive can save you $300 over the cost of a SCSI drive and high-performance SCSI adapter.

Our review drives include eight 12X-rated CD-ROM drives from Aztech, Creative Labs, Pioneer, Plextor, Samsung, Teac, and Toshiba. We also looked at four drives rated faster than 12X from Acer, Sony, Toshiba, and Wearnes. Drive manufacturers can't build new units with a standard rate beyond 12X—many CD-ROM discs are imperfectly balanced and vibrate at higher rates of spin. So manufacturers applied a clever solution: *hybrid* drives, which transfer data at a higher rate when reading certain parts of the disc (see "The Evolution of the CD-ROM Drive").



PLEXTOR'S KIT HAS everything—including an optional PCI SCSI adapter.

You can find most of the drives we tested in stores, in upgrade kits, or à la carte, depending on the manufacturer. However, we also tested four models that sometimes come in new PCs or are sold in kits by companies that buy them in quantity to package for resale under their own label or private labels. These drives include Pioneer's 12X DR-444 EIDE and DR-466 SCSI models, Sony's 8X/16X CDU-511 16X Max EIDE drive, and Wearnes's 12X/16X CDD-1620 EIDE unit. Pioneer drives are most commonly sold as Pioneer products by independent vendors such as Hi-Val or with a private label. Sony sells drives to some major system vendors such as Dell. At press time, Wearnes was seeking a new distributor.

New drives from some of the major manufacturers weren't available for review. NEC, which once offered CD-ROM ▶

					FEATURES			SUPPORT		
Price rating	Performance rating	Ease of installation	Features	Support policies	Bundled application software	Average access time (ms.)	Built-in buffer (K)	Warranty (years)	Weekday support (hours)	Reader service number
expensive	outstanding	very good	outstanding	outstanding	Plextor Manager	105	512	2	11 [3]	601
expensive	outstanding	very good	good	good	none [4]	90	256	1	8	602
n/a [6]	outstanding	very good	good	vary [7]	varies [7]	100	128	varies [7]	varies [7]	603
inexpensive	good	outstanding	very good	good	audio CD player, drivers	125	256	1	8	604
inexpensive	good	outstanding	good	good	none [4]	115	256	1	8	605
inexpensive	good	outstanding	good	good	drivers	150	256	1	24 [3, 8]	606
inexpensive	good	outstanding	outstanding	very good	Microsoft Encarta, drivers	150	256	1	16 [8]	607
very inexpensive	fair	very good	very good	good	drivers	130	256	1	8 [3]	608
expensive	good	outstanding	very good	outstanding	drivers	120	256	1	24 [3, 8]	609
n/a [6]	good	very good	good	vary [7]	varies [7]	100	128	varies [7]	varies [7]	610
n/a [6]	good	very good	good	vary [7]	varies [7]	105	256	varies [7]	varies [7]	611
n/a [6]	good	very good	good	vary [7]	varies [7]	130	256	varies [7]	varies [7]	612

All products: 901

[5] Available only through third-party vendors.
[6] Can't evaluate; not sold directly by manufacturer.
[7] Software and support determined by third-party distributor.
[8] Same hours Saturday and Sunday.

The Evolution of the CD-ROM Drive

CD-ROM TECHNOLOGY keeps progressing, resulting in faster drives and better software. Hybrid CD-ROM drives improve on standard drives by reading parts of the CD-ROM disc faster. The first DVD-ROMs expand capacity, holding seven times as much content as a CD-ROM disc and making DVD-ROM drives a slam-dunk choice for multimedia use.

HOW THEY WORK

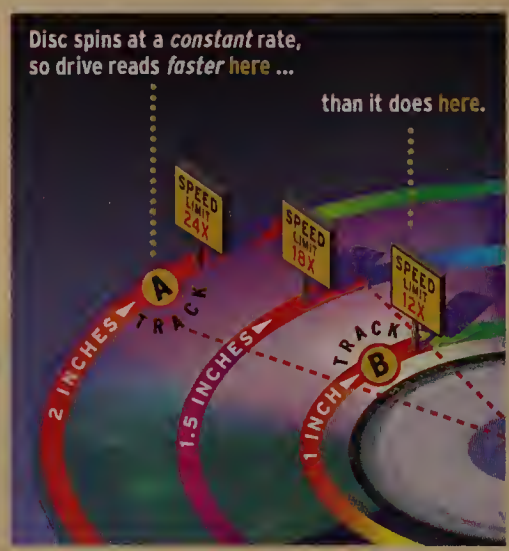
Standard CD-ROM Drives

No matter where this standard CLV (constant linear velocity) drive's head is on a disc, it reads data at the same rate: 12X (1800K per second), as shown below. Outer tracks are longer than inner tracks but hold the same amount of data per inch. So to read the same amount of data per second, the CLV drive must spin the disc slower when reading outer tracks than when reading inner tracks.

- 650MB capacity for data
- 74-minute capacity for VHS-quality video

Hybrid CD-ROM Drives

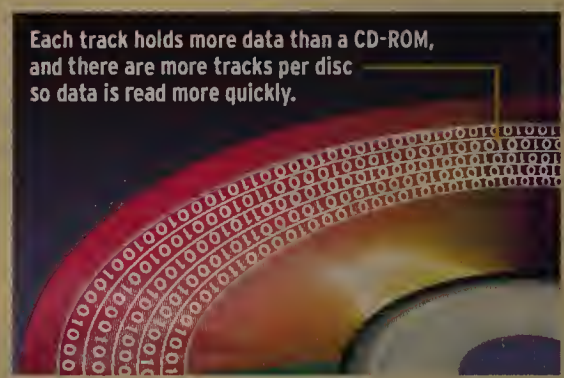
A hybrid drive can spin the disc at a constant rate as the head moves outward, or it can act as a standard CLV drive. This added ability is called *constant angular velocity.* When the head is on an outer track, data passes—and is read—faster than when the head is on an inner track. Even with a disc full of data, a 12X/24X CAV drive can read only the outer tracks—a tiny percentage of the data—at 24X.



- 74-minute capacity for digital audio
- Drives read CD-Recordable media

New DVD-ROM Drives

DVD-ROM, designed with video in mind, dramatically increases disc capacity. Its drives use a more sophisticated read head and a tighter laser beam, and the discs hold seven times as much data. As a result, drives spinning only fast enough to yield about 4X speed with CD-ROMs read the much more tightly packed data off a DVD-ROM at about 9X. That's fast enough for great multimedia performance.



- 4.7GB capacity (first generation)
- 17GB capacity (second generation, dual-sided)
- Disc has room for 133 minutes of digital video with eight Surround Sound audio tracks, or an application requiring seven CD-ROMs
- Drive reads CD-ROMs but not CD-R media

upgrade kits, no longer sells to end users. LG Electronics (formerly Goldstar), Mitsumi, Panasonic, and Philips were all between drive revisions. Check future *New Products* for reviews as new drives appear.

BEST BUYS: TEAC AND PLEXTOR

WE EVALUATED each drive's speed, ease of installation, features, documentation, and support and picked two Best Buys: Teac's $149 CD-512E 12X EIDE drive and Plextor's $269 12PleX PX-12CSi, a SCSI model. Consider the Teac for personal use or general office duty. The bare Teac drive we tested fresh off the production line was about 10 percent slower than the quickest EIDE models—the 8X/16X Sony and 12X/16X Wearnes. However, the Teac was still a good-performing EIDE drive, and by the time you read this it will be available in an upgrade kit. The Plextor 12PleX PX-12CSi drive is our pick when top performance is a must. Thanks to its good design and SCSI interface, it's over 15 percent quicker overall than the fastest EIDE models. It's also a good choice for situations where the drive will get a lot of handling. The Plextor's caddy feed requires you to place a disc inside a special cartridge for loading. It's less convenient than the more common motorized tray that all the others use, but it's stronger.

While they don't quite equal our Best Buys, Samsung's $135 SCR-1231 and Toshiba's $145 XM-5702B, both 12X EIDE drives, are good values. Neither comes in an installation kit, so consider them only if you're a do-it-yourselfer.

Creative Labs' $180 Infra 1800, a 12X EIDE model, is one of the most interesting drives—it comes with a programmable infrared remote. It should appeal to you if you love gadgets or want to use the remote for presentations, but you'll pay extra for the bells and whistles.

Two models were disappointing: Acer's $159 8X/18X CD616A and Aztech's $105 Zeta 12X. The Aztech has an alluring ▶

Plextor's our choice when top performance is a must.

INFOGRAPHIC: SANDRA KELCH

MMX™ intel inside pentium® PROCESSOR

The new high-performance HP OmniBook 5700 features:

DMI standard solution

Multiple-operating-system support including Windows® NT

Security built into the BIOS

150 or 166 MHz Intel® Pentium® processor with MMX™ Technology

Nothing personal here, it's strictly business.

Get down to business at our quick link: www.hpresource.com/omnibook-4

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rock-bottom price but is the slowest drive reviewed. And the Acer hybrid did not live up to the promise of its 18X speed rating.

The $269 Toshiba XM-3801B-S, a 12X/15X hybrid SCSI drive, is very fast and well built but has a shorter warranty than the Plextor, and it comes from Toshiba only as a bare drive.

Pioneer's 12X DR-444 EIDE and DR-466 SCSI models performed well. If you find them packaged by Hi-Val or another vendor with a good price and warranty, both are worth considering. Sony's 8X/16X CDU-511 16X Max EIDE drive and Wearnes's 12X/16X CDD-1620 EIDE model closely matched each other's fast performance. The Sony is a worthy contender if you find it offered in a Dell system or in another vendor's new PC. We like the Wearnes drive, although it will be difficult to find until Wearnes comes up with a new distributor.

CREATIVE LABS' Infra 1800 comes with a credit card-size remote controller.

INSTALLING OFFICE IN A MINUTE

UNLESS A NEW CD-ROM drive improves the speed of your most frequent tasks, there's not much point in upgrading. We tested the drives using a number of common CD-ROM–based chores. We ran a photo CD slide show, loaded a CD-ROM encyclopedia, copied 100 photos to our hard drive, ran a Macromedia Director animation, installed Microsoft Office 95, and performed an unindexed search in Phone Disk's Powerfinder national telephone directory. Finally, we tested full-motion video performance by measuring the frame rates of MPEG and AVI video clips played with software video players.

Although two EIDE drives—the Sony and Wearnes hybrids with a 16X top speed rating—matched SCSI drive speeds in a couple of tests, the SCSI units were faster overall. A SCSI drive will nearly always outperform an EIDE-based model if you use a high-performance adapter, such as the $240 Adaptec AHA-2940 Ultra PCI adapter we used. A fast SCSI card of this type has a processor that manages much of the data, taking a load off your PC's CPU. You can buy less expensive 8- and 16-bit SCSI adapters for about $50, but they won't perform as well. ▶

TEST REPORT

SCSI CD-ROM Drives Are Fastest

All the new drives easily outpace the 4X reference drive—especially copying files and installing software.

	MODELS	Drive speed min/max	Test times (◀ Faster … Slower ▶)	MPEG-1 video playback (Frames per second)	AVI video playback (Frames per second)
SCSI-2	Toshiba XM-3801B-S	12X/15X		77	29
SCSI-2	Plextor 12PleX PX-12CSi*	12X/12X		78	29
SCSI-2	Pioneer DR-466	12X/12X		77	29
EIDE	Wearnes CDD-1620	12X/16X		65	24
EIDE	Sony CDU-511 16X Max	8X/16X		65	24
EIDE	Pioneer DR-444	12X/12X		64	24
EIDE	Toshiba XM-5702B	12X/12X		65	23
EIDE	Samsung SCR-1231	12X/12X		65	24
EIDE	Creative Labs Infra 1800	12X/12X		57	24
EIDE	Acer CD616A	8X/18X		64	25
EIDE	Teac CD-512E*	12X/12X		65	24
EIDE	Aztech Zeta 12X	12X/12X		64	24
EIDE	Mitsumi CRMC FX400E[1]	4X/4X		64	23

Our real-world suite of performance tests reveals a steep improvement from 4x to 12x and beyond.

*Best Buy [1]Reference drive

Minutes 0 5 10 15 20 25

Corel Pro photo CD slide show · File copy · Office 95 installation · Encarta 96 launch · Macromedia Director movie viewing · Phone Disk search

HOW WE TEST For complete methodology, see www.pcworld.com/jul97/cd-rom.

The HP 300 Series Palmtop PC
Featuring the widest screen so you can view information like you would on your desktop PC
VGA wide screen: 640 x 240 pixels
Direct print capabilities through an infrared connection
Wireless e-mail and Internet access via Type II PC Card Modem*
Fast and easy synchronization with your desktop PC
From $499†

The problem with most handheld PCs is that the screen isn't wide enou

To get the whole picture, see our quick link: www.hpresource.com/palmtop-3

*Optional accessory available at additional price. †Projected U.S. street price. Microsoft and Windows CE are U.S. registered trademarks of Microsoft Corporation. ©1997 Hewlett-Packard Company PPG450

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A new CD-ROM drive will bring the greatest speed boost to tasks that require heavy data throughput, such as copying files and installing software. For example, it took the 4X Mitsumi reference drive more than 10 minutes to copy 100 digital photos totaling 365MB from a CD-ROM onto our hard drive. All the new EIDE drives finished the job in under 4 minutes—a 165 percent improvement. The fastest drive—the Toshiba XM-3801B-S, a 12X/15X SCSI hybrid—did even better, copying the files in less than 3 minutes. The two 12X SCSI drives matched the 3.5-minute results of the Wearnes 16X drive, the fastest EIDE model on this test.

Software installation also showed a big speedup. All the drives installed Office 95 more than two and a half times faster than the 4X reference model, averaging 71 seconds. (Our animation played about twice as fast, too.) As in most of the other tests, the SCSI drives were generally quicker on these benchmarks.

The speed differences narrowed to about 25 percent when we ran a photo CD slide show. In this test the SCSI drives were once again fastest. A few tests showed little or no speed difference. Software loading probably won't get much faster—especially if the program stores its executables on your hard drive: The new drives loaded Microsoft's popular encyclopedia, Encarta 96, a maximum of 6 seconds faster than the 4X drive. Furthermore, the video in most education and entertainment titles is still optimized to work on older 4X or even 2X CD-ROM drives. With video clips and phone directory searches, only the SCSI drives showed a consistent if relatively small improvement over the 4X drive.

The highest speed rating doesn't always indicate the fastest drive. Big jumps—say, from 4X to 12X—usually ensure an overall speedup. But when ratings exceed 12X, performance becomes hard to predict. For instance, the model rated fastest in our group, the 8X/18X Acer EIDE drive, turned in some of the slowest times. Even drives with the same speed rating can perform differently. Aztech's Zeta 12X EIDE drive was only about 45 percent faster

DVD: Delayed No More

DVD-ROM DRIVES HAVE a more glamorous reason for being late to market than most tardy PC products: This time you can blame Hollywood.

The first DVD-ROM drives were due last October. By now drives from Panasonic, Pioneer, and Toshiba should actually be out. Why the delay? The first set of specs for DVD and DVD-ROM wasn't approved by the home video industry until late fall. With Hitachi, Pioneer, and others working on DVD-Recordable drives, companies like Warner Media Services demanded the most stringent copy protection.

"Critical money comes from home video," notes Peter Black, president of Xiphias, a Los Angeles developer whose Encyclopedia Electronica was made specifically for DVD. The home video industry "was terrified that pirated DVD copies would put them out of business," says Black.

What makes DVD worth waiting for? Storage capacity, for one thing. Discs used in CD-ROM drives hold 650MB of data, 74 minutes of VHS-quality video, or 74 minutes of sound, whereas the first DVD-ROMs hold 4.7GB of data—seven times as much. Dual-layer, double-sided DVD-ROMs ultimately will *quadruple* that capacity to about 17GB. Translated into video space, that means one DVD movie disc can hold over 2 hours of superb digital video, with up to eight separate Surround Sound tracks.

As we were writing this review, the first DVD players hit the shelves. These set-top entertainment boxes work with your TV to play DVD movies and audio CDs but not DVD-ROM programs. They're pricey: $500 to $700 for the first Toshiba and Panasonic players. Only a few DVD movies were available at press time, for about $35 each.

WHAT CAME FIRST

THE FIRST DVD-ROM drive kits—from Creative Labs and Hi-Val—were announced at the end of March. Neither was available in time for review. This summer Hitachi will start selling the first double-speed DVD-ROM drives, which the company says will speed DVD-ROM and CD-ROM applications. You'll find the Hitachi drive sold in some PCs and private-labeled in stores.

Like the DVD movie players, the first EIDE DVD-ROM drives are expensive. The complete kits, which include internal cards that handle decompression of the MPEG-2 video, cost between $500 and $1000.

Just as important, it will take a year or more before a large selection of DVD-ROM applications and movies is available.

So unless you *have* to be first on your block to own the latest technology, we suggest waiting a while. This is one time when it may pay to be late.

DESPITE THEIR TARDY arrival and high price, DVD-ROM drives like the Toshiba shown here are generating lots of excitement.

A DVD-ROM disc can hold 4.7GB, seven times as

overall than the 4X reference drive; the other 12X EIDE drives averaged about 60 percent faster than the 4X unit.

REAL PLUG AND PLAY

CD-ROM DRIVE installations have gotten easier recently, thanks to Windows 95, EIDE CD-ROM drives, and Plug and Play SCSI adapters and drives. This time we experienced no trouble, even with the bare Pioneer, Sony, and Wearnes drives, which aren't intended for direct sale to end users. If you're installing an EIDE drive in a Windows 95 PC, the operating system will do everything but connect the cables and attach the screws. On boot-up, the operating system recognizes the drive and automatically assigns it a letter. If you're using Windows 3.1 or DOS, you'll need to install a driver. For the SCSI drives, the process is similar, although you have to install a SCSI card and software—usually a snap if you have a fairly new PC and a Plug and Play SCSI adapter.

The quality of the manuals varies. Creative Labs, Plextor, and Samsung provide plenty of detailed diagrams and instructions fit even for the most inexperienced installers. Toshiba's manuals are also relatively thick, complete, and well written, and Acer's documentation covers the basics in five languages. The barebones Teac CD-512E we tested came with the same good manual you get in the upgrade kit, which also includes sound and data cables and driver software. The poorest manual came with Aztech's kit: Of its meager six pages, only one is in English.

The vendors for all the retail drives provide technical support, but only Acer, Aztech, Plextor, and Samsung have toll-free numbers. Many vendors offer just 8 to 11 hours of tech support each weekday. Acer and Samsung stand out with round-the-clock help every day, while Creative Labs makes support available 16 hours a day, seven days a week. Most drive warranties run for one year, with the notable exception of Plextor, which provides a two-year warranty.

CREATIVE LABS' Infra 1800 has the most control buttons. Top to bottom: Plextor, Creative Labs, Teac, Samsung.

What you'll get with your drive depends on where you buy it. We tested the latest models, often sent as bare drives from early production. By the time you read this, the Teac CD-512E (tested as a bare drive) will come with data and sound cables, a manual, and extra drivers. Plextor's kit is the best, providing everything you're likely to need: great manuals for both drive and software, mounting rails, screws, and sound and data cables.

All the drives have a load/eject button, a headphone jack, and an audio CD volume control. Acer, Aztech, Creative Labs, Plextor, Samsung, and Wearnes add play/scan buttons for use with audio CDs.

Creative Labs' Infra 1800 has a ▶

DVD-ROM Delivers

JUST HOW GOOD IS DVD-ROM? Based on our review of a near-production-level Toshiba EIDE DVD-ROM drive, this new format delivers every bit of the great sound and video that manufacturers have been promising.

After months of delay, Toshiba finally came through with a DVD-ROM package we could test. Since no commercial kits were available, Toshiba sent us its DVD-ROM drive preinstalled with an MPEG-2 card in a Pentium-200 multimedia PC. We examined the drive's DVD features in this system, then reinstalled the drive in our Quantex Pentium MMX-166 test PC for benchmarking. Later this year you're likely to see the DVD-ROM drives in some new Toshiba PCs, although at press time the company wasn't saying which ones. Initially, the drive will be available in retail DVD-ROM drive kits from Hi-Val and other distributors.

VIVE LA DIFFÉRENCE

DVD-ROM DRIVES and discs look much like their CD-ROM counterparts. But taking two DVD-ROM programs for a spin in the Toshiba drive quickly dispelled the illusion of similarity. We tried two of the few DVD-ROMs available at press time: Tsunami Media's Silent Steel, a cinematic adventure game that ordinarily requires four CD-ROMs, and Creative Multimedia's Billboard Guide to Music. Both looked and sounded great, with detailed high-resolution video playing full screen.

Because of its slower spin rate, the DVD-ROM drive's speed using CD-ROM was only marginally better than our 4X reference drive's. Our two Best Buy CD-ROM drives, Teac's CD-512E EIDE unit and Plextor's 12PleX PX-12CSi SCSI, were respectively about 50 and 70 percent faster overall than the DVD-ROM drive.

The Toshiba DVD-ROM drive will be available first in Hi-Val's DVD System, which will sell for $699 with a Quadrant International Plug and Play PCI MPEG-2 card and a hefty bundle of DVD-ROM titles, including Silent Steel, Activision's Muppets Treasure Island, Origin Systems' Wing Commander 4, Xiphius's Encyclopedia Electronica, and others. Creative Labs' less expensive PC-DVD package will cost $500 and include a Panasonic DVD-ROM drive and MPEG-2 decoder, along with the DVD-ROM Warner movie sampler.

◆ **DVD System**
$699 street, Hi-Val, 714/953-3000, www.hival.com
READER SERVICE NO. 662

◆ **PC-DVD**
$500 street, Creative Labs, 800/998-5277, www.creativelabs.com
READER SERVICE NO. 663

much as a CD-ROM. Future discs will hold up to 17GB.

unique extra: an infrared remote for controlling CD-ROM slide shows, video CDs, and audio discs. If you're always within easy reach of your drive, the remote control may be more trouble than it's worth. But if you like gadgets, do a lot of presentations or want to assemble a remote-control multimedia workstation, the drive warrants a test run. The Infra 1800 also includes Microsoft Encarta.

Plextor throws in its own unique Plextor Manager, which covers the gamut of audio CD player functions and more. It recognizes and identifies any type of CD, including format and type of files. It also lets you create digital .wav files from audio discs and mix digital audio tracks.

WHAT'S NEXT FOR CD-ROM

IF YOU'RE STILL wondering whether CD-ROM is headed for an early grave, it's worth noting that the companies developing DVD-ROM drives—industry giants like Panasonic, Philips, Pioneer, and Toshiba—are also designing and selling new CD-ROM drives as fast as they can. Within the next few months to a year, expect to see lots more hybrid drives, with top rates of 20X, 24X, and beyond. The base speed should stay around 12X, so it's doubtful you'll see spectacular leaps in performance over the fastest of the drives we've reviewed here. Some, however, will offer perks like the ability to read CD-Rewritable discs—something that no current CD-ROM drive is able to do.

DVD-ROM drives also look very promising, especially for home use, but they'll have to come down quite a bit in price and be faster with CD-ROM programs to become a practical mainstream business product. Check our monthly *Top of the News* and *New Products* sections for reviews of new CD-ROM and DVD-ROM products as they become available.

◆ **Adaptec AHA-2940 Ultra PCI adapter**
$240 street, Adaptec, 800/442-7274, www.adaptec.com/deskpcon/d_sheets/AHA2940Features.html
READER SERVICE NO. 664

Erik Holsinger is a CD-ROM producer in San Francisco. Rex Farrance is a PC World *senior associate editor. Testing by Ulrike Diehlmann and Michael Salayko.* ■

CD-Rewritable Drives Record and Erase

CD-RECORDABLE DRIVES are great for people who want to create their own CD-ROMs. For less than $600, you can pick up a drive like Hewlett-Packard's popular 6X-read/2X-write SureStore Internal CD-Writer 6020 and a ten-pack of blank CD-R discs. Not a bad price to pay for the ability to record 650MB of data or 74 minutes of your favorite music.

But wouldn't it be nice if you could also erase the discs and use them over again? With a CD-Rewritable drive, you can. The first CD-RW drive comes in Ricoh's new $699 MediaMaster Kit, which contains a 6X-read/2X-write MP6200S tray-loading internal drive with a 1MB buffer. The kit also includes software: Adaptec's EZ CD Pro 95 and DirectCD (for writing CD-R and CD-RW discs) and Seagate's Backup Exec 95. In addition, you get one blank CD-RW disc and one blank CD-R disc, and a PE Logic SCSI-2 adapter. We looked at one of the first production models with prerelease copies of the Adaptec programs and our own Adaptec AHA-2940 Ultra card. Even though the software wasn't final, we were able to record and erase discs.

◆ **SureStore Internal CD-Writer 6020**
$599 street, Hewlett-Packard, 800/826-4111, hpcc920.external.hp.com:80/cdwriter/main.html
READER SERVICE NO. 665

◆ **MediaMaster Kit**
$699 street, Ricoh, 702/352-1600, www.ricohdms.com
READER SERVICE NO. 666

FIRST WRITES

INSTALLATION WAS a simple matter of hooking up a SCSI CD-ROM drive; within 10 minutes we were ready to load the software. EZ CD Pro is best when you want to record a whole disc at once; DirectCD, with its drag-and-drop approach, makes it easy to copy and archive a few files or folders at a time. With each program, it took about 5 minutes to copy 100MB from our hard drive onto the discs—and less time to erase the CD-RW media. Ricoh says you can erase a disc 1000 times before wearing it out. You can save a lot of money by using CD-R discs when you don't need erasability: CD-RW discs cost $25 each, compared with about $6 per blank CD-R in quantity.

RICOH'S NEW MP6200S CD-RW drive: At last, you can write and rewrite data on a disc almost as if it were a 650MB floppy.

Note that the current batch of CD-ROM drives can't read the Universal Disc Format of CD-RW media. But the next generation of CD-ROM drives will be able to. Some may even be available by the time you read this—check with your vendor.

Will CD-RW doom dedicated CD-R drives? Probably not. However, you can bet that prices on CD-R drives will drop once again.

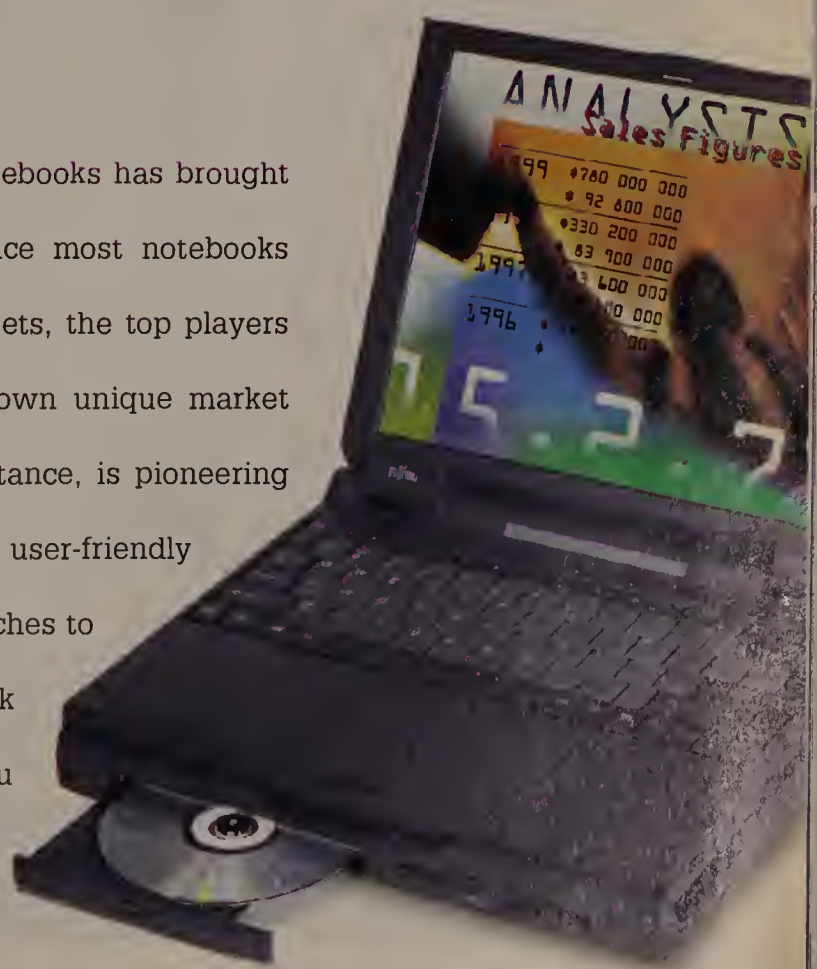
The next step is DVD-Recordable and DVD-Rewritable drives. The latter will appear under the unlikely sounding name DVD-RAM. Pioneer expects to introduce the first DVD-R drive this summer—a professional product rumored to cost over $10,000.

At about the same time, Hitachi will come out with a consumer DVD-RAM drive that will be sold under private label. Pricing was unavailable at press time but is likely to exceed $1000. Disc capacity will be about 4GB for DVD-Recordable and 2.6GB for DVD-Rewritable.

The First Notebooks That Put People First

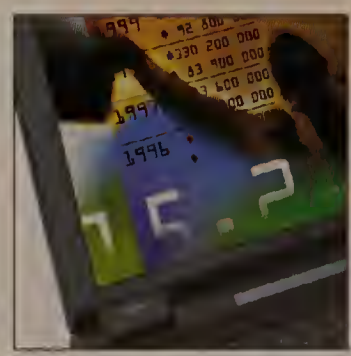
Growing popularity spurs demand for powerful, reliable notebook computers designed with user comfort in mind.

The skyrocketing popularity of notebooks has brought with it intense competition. Since most notebooks offer similar performance and feature sets, the top players are making moves to stake out their own unique market niches: Fujitsu PC Corporation, for instance, is pioneering the development of new ergonomic and user-friendly models by adding decidedly human touches to the latest high-performance notebook technology. The introduction of Fujitsu PC Corporation's new LifeBook™ Family of notebook computers is but the most



FUJITSU
FUJITSU PC CORPORATION

recent illustration of the firm's commitment to provide mobile computing solutions that seamlessly integrate into the user's life.



The LifeBook Family's unique "human touches" make for a user experience that is productive *and* comfortable.

The LifeBook Family of Notebook Computers.

The strategy behind Fujitsu PC Corporation's LifeBook Family of notebooks is to blend the latest technology, superior quality, and a "Built for Humans" approach into comprehensive solutions for mobile professionals. After five years and billions of dollars of research and development, this initiative has resulted in a line of notebooks that brings a new level of flexibility, modularity, and ergonomic comfort to the industry.

Across the line, features such as an easy-to-read status indicator for on-board operating information, wide palm rests, sturdy, full-size keyboards, and top-quality, large, crisp screens make for a user experience of unprecedented ease and convenience. Additional "human-touch" features include comfortable, rounded corners, a contemporary, midnight-blue color, and multi-function bays that easily let mobile professionals custom configure their LifeBook notebooks with second batteries, hard drives, or other devices to meet their personal needs.

Built on Advanced Core Technologies.

These and other LifeBook comfort features are overlaid upon core technologies consisting of 150MHz, 133MHz, and 120MHz Intel Pentium® processors

MMX™ intel inside pentium® PROCESSOR

Built for Humans?

"The workplace has changed dramatically in the past few years," observes Fujitsu PC Corporation President George Everhart. "Fewer and fewer people find themselves tied to the office. They're at branch offices, at client sites, at home, or on the road." The Internet, notebooks, corporate intranets, and cell phones have been major forces in bringing about this new-look workforce. And the changing workforce has caused corporate America in large part to reinvent itself, too. Management has decentralized, and efforts to boost productivity have given rise to innovations such as flex time and telecommuting. But while new technologies have helped create a business environment that is more flexible and unfettered, they have also forced users to conform to a variety of high-tech devices.

Fujitsu PC Corporation President George Everhart.

"The notebook has changed the way we work," says Everhart. "Now it's time for the way people work to change the notebook." This is the kind of thinking that led to Fujitsu PC Corporation's revolutionary "Built for Humans" philosophy. And the reason why Fujitsu PC Corporation has committed itself to go beyond the requisite performance and functionality to develop the most comfortable notebooks in the industry. "By considering human needs, we have been able to create products for mobile professionals that combine leading-edge technology, competitive pricing, mobility, and quality with comfort, convenience, flexibility, and style," says Everhart. The result is the LifeBook Family—business solutions that are truly "Built for Humans."

with MMX™ technology (only available on select models), PCI and PC CardBus architectures, and large, high-resolution passive-matrix (DSTN) or active-matrix (TFT) screens. To get down to business fast, most LifeBook notebooks come equipped with a broad selection of preinstalled Internet and productivity software. And for advanced multimedia, LifeBook notebooks include high-speed CD-ROMs, built-in speakers with 16-bit SoundBlaster™ compatible stereo sound, MPEG-1® full-motion video support, and Zoomed video acceleration.

The LifeBook Family provides a complete set of I/O connections for enhanced flexibility with communication and connectivity devices including serial, parallel, IrDA-compatible infrared, external monitor, keyboard/mouse, external FDD, and docking ports. With a mini-docking station—complete with two additional Type II or one Type III PC Card slots and an integrated 10/100 Ethernet port—the LifeBook Family can offer all the essential features of a desktop replacement solution. A number of other options is also available.

To assure that up-to-the-minute advancements in processor, screen, communications, battery, and software technologies are continuously incorporated into the LifeBook line, Fujitsu PC Corporation has forged strong partnerships with industry leaders such as Intel and Microsoft.

Designed for Microsoft Windows 95

A Family with Appeal for All Types of Mobile Professionals.

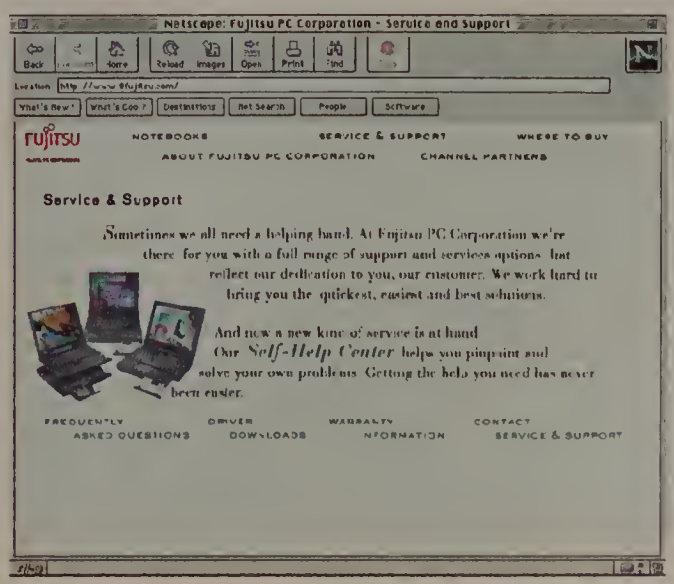
With its broad range of functions, features, and options, the LifeBook Family is designed to provide solutions that meet just about any kind of mobile computing need—from the home office to the Fortune 500 corporation. Ease of use and ownership, as well as benefits that include a three-tiered service and support structure, a pre-purchase product evaluation program, PC Card slot locks for security, and built-in fax/modems for fast communications with corporate headquarters make the LifeBook Family particularly attractive to corporate customers.

Built for Humans. But Kind to the Bottom Line, Too.

The LifeBook Family's ability to share many peripherals such as memory, batteries, CD-ROMs, and docking options provides the advantage of having a standard set of connectivity, storage, and power devices. Corporate users with a large installed base of LifeBook notebooks—entry-level models, top-of-the-line units, or a mixture—will find that the flexibility of having a common set of devices at their disposal can make for a low cost of ownership, providing significant economies over time. Additionally, Fujitsu PC Corporation's rigorous manufacturing processes and quality testing, bolstered by a $3 billion annual research and development budget, have made for products whose durability and reliability are second to none in the industry. These and other cost-saving attributes of the LifeBook Family are drawing the attention of a growing number of IT decision makers.

Service and Support Also Delivered with a Human Touch.

To complement the human orientation of its product engineering, Fujitsu PC Corporation has placed customer satisfaction at



Users can conduct remote diagnostics and downloads instantly at Fujitsu PC Corporation's automated, no-waiting service web site (www.8fujitsu.com).

Fujitsu PC Corporation in Brief.

Fujitsu PC Corporation is a wholly owned subsidiary of Fujitsu, Ltd. of Japan. It was established in 1996 in a move by Fujitsu to expand its personal computer business into the American market. The company's corporate headquarters and design center are located in the heart of the Silicon Valley in Milpitas, California. The firm also utilizes a manufacturing facility in Hillsboro, Oregon.

Because of its affiliation with Fujitsu Ltd., Fujitsu PC Corporation is in the enviable position of being able to leverage the financial and technical strengths of the world's second-largest computer maker* and sixth-largest notebook manufacturer. Fujitsu Ltd., founded in 1935, is a $36 billion leading supplier of computers, communications, and microelectronics. Over the course of its 62-year history, the company has been a technology pioneer in areas as diverse as data communications, flat-panel displays, network computers, artificial intelligence, and desktop personal computers.**

* *Datamation* Global 100, *Datamation* Magazine, June 16, 1996
** International Data Corporation, March 1997

Circle 101 on reader service card

the center of its service and support operations. For instance, the Fujitsu PC Corporation Call Center sets a standard for the industry with an average wait time of less than two minutes for support calls, and an average warranty repair time of under four days. Even the manuals and tutorials have been written with the user in mind—novices and computing veterans alike.

LifeBook notebooks are backed by a standard three-year limited warranty†, including toll-free technical phone support (1-800-8FUJITSU), 24 hours a day, every day. Additionally, the LifeBook service and support web site is automated, allowing users to conduct remote diagnostics and download any software drivers they need—from audio to SoftPEG®. The LifeBook Family also offers Business Class and Executive Class options that can provide supplemental support, up to and including overnight repairs and shipping of exchange units. It's all part of a philosophy that puts the needs of the customer first.

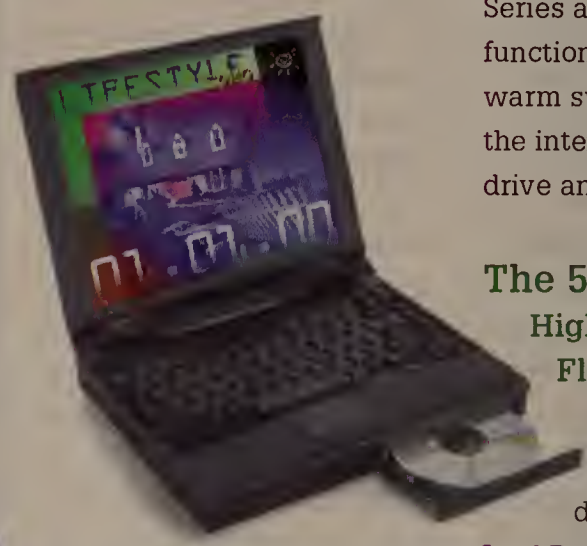
"What Mankind Can Dream, Technology Can Achieve."

It is fitting that Fujitsu PC Corporation is part of an organization with bold vision. "What mankind can dream, technology can achieve" demonstrates Fujitsu's commitment to innovation and its keen understanding of the central role technology plays in today's rapidly changing world. "By building the future into each of our products, we are giving our customers a head start into the next century," says Fujitsu PC Corporation Chairman Akio Hanada. "We see a future where data, communications, information, and entertainment will all converge, and our products are evolving in that direction," he continues. "We're not just keeping up with the advances in mobile computing. We're creating them."

Just the Facts: The LifeBook Family.

The 400 Series—
The Entry-Level Solution.

The LifeBook 400 Series comes equipped with 120MHz Intel Pentium processors, a 10X CD-ROM, and advanced multimedia capabilities. Weighing 7.3 pounds and running on a NiMH battery, the 400 Series offers users a portable solution that provides up to two hours of battery life. For those who prefer, Lithium ion battery technology is available as an option. Other features include an 11.3" passive-matrix (DSTN) screen, a 1GB hard drive, 16MB of RAM (upgradable to 72MB), two Type II and one Type III PC Card slots, and a TouchPad pointing device. The LifeBook 400 Series also features a multi-function bay that allows warm swapping between the interchangeable CD-ROM drive and floppy disk drive.



The 400 Series: The ideal solution for price-conscious new users, students, or telecommuters.

The 500 Series—
High-Performance Flexibility.

The LifeBook 500 Series comes standard with a 133MHz Intel Pentium processor or a 150MHz Pentium processor with MMX technology, 32-bit PCI and PC CardBus architectures, 16MB of EDO RAM (expandable to 80MB), 256KB level 2 cache, 1.3GB or 2.0GB hard drives, and high-resolution 11.3" or 12.1" active-matrix (TFT) color screens, all powered by Lithium ion batteries. All

The 500 Series: Modular yet fully featured notebook solutions for mobile professionals.

† The LifeBook 400 Series comes with a one-year warranty.

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The 600 Series: Lightweight, innovative component options in a sleek design.

four models have internal 33.6 bps fax/modems, 2MB of VRAM, and modular 10X CD-ROMs. LifeBook 500 models range from 6.8 pounds with the floppy disk drive installed to slightly over seven pounds with the CD-ROM installed. A truly distinguishing feature of this versatile Series is its ability to share a broad selection of common peripherals across the line.

MMX™ intel inside pentium® PROCESSOR

The 600 Series—
The Ultra-Flexible, Ultra-Portable Innovator.

Powered by dual lightweight Lithium ion batteries, the LifeBook 600 Series comes standard with a 133MHz Intel Pentium processor or a 150MHz Pentium processor with MMX technology, 32-bit PCI and PC CardBus architectures, 16MB of EDO RAM (expandable to 80MB), 256KB level 2 cache, a 1.3GB hard drive, 28.8 or 33.6 bps internal fax/modems, and a high-resolution 12.1" active-matrix (TFT) color screen. The product has 2MB of VRAM and two Type II PC Card slots. The 600 Series provides all the communications and connectivity flexibility of the 400 and 500 Series, as well as a standard Enhancement Unit that quickly turns this mobile business tool into a complete multimedia system or the ideal desktop replacement. With an 8X CD-ROM, 3.5" floppy disk drive, stereo speakers, MIDI/joystick port and duplicate system ports, this unique Enhancement Unit offers professionals the choice of using their LifeBook as a full-featured, standard-weight notebook or as an ultra-lightweight powerhouse. Weighing in at just 4.4 pounds, the 600 Series is among the industry's lightest.

Discover More about the First Notebook Computers Expressly "Built for Humans."

With so many human touches—from design to support—built into a LifeBook notebook computer, it may be just the right touch for you or your organization. So why not find out more about what a notebook "Built for Humans" can do for you? Just visit a dealer near you, or contact Fujitsu PC Corporation for more information today.

To find out more about the LifeBook Family of notebook computers:

- **Call 1·888·4·ON·THE·GO, ext. CD12**
- **Get a QuikFacts fax at 1·800·936·5209**
- **Visit www.fujitsu-pc.com**

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Built *for* Humans.

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FIND A great pc deal ON THE web

Great prices, no waiting, no pushy salespeople—shopping for computer products on the Web has its advantages. But the rules of buying smart still apply.

BY PETER SCISCO

Psst. Want to know a great place to find a deal on a computer? It's got low prices, a huge inventory, and zero sales pressure. You don't have to fight traffic to get there, and best of all, the store never closes—you can shop anytime day or night. Where is this high-tech haven? On the Internet, of course.

These days, many hardware vendors, mail-order companies, and even retail outlets have set up shop on the Web. You can buy anything from a $30 cable to a $30,000 network server, all with a few clicks of the mouse.

The Web probably won't have lower prices—merchandise costs pretty much the same whether you buy it online, visit a retail store, or purchase it over the phone. But on the Web you can quickly compare prices between online shops to find the best deal; that's a lot faster than thumbing through catalogs or driving from store to store. You can also research ▶

ILLUSTRATIONS BY JOYCE HESSELBERTH

Printer
File
Print
Cancel
POWER

products, search for those that meet your criteria, compare specs among a wide range of systems, even configure your dream PC. Just try doing all that at your local Computers 'R' Us.

The downside is that the Internet can be a cold and lonely place to shop. Want to ask a question before pulling out your credit card? You'll have to call the store or send e-mail and wait for a response. You'll also want to track your order more closely than you normally would, lest it fall into a black hole in cyberspace. And if you're not careful, you could end up being fooled by a bogus Web site, buying shoddy merchandise, or getting stuck with huge restocking fees.

Where on the Web should you go to find the perfect deal? You have three choices. You can visit an online shop, many of which are offshoots of chain stores and mail-order firms such as CompUSA and Micro Warehouse. You can check out "shopping services" like Computer ESP and Price Watch, which help you find the site with the best price. Or you can dial up the sites of direct-sale PC manufacturers like Dell and Gateway 2000, configure the system you want, get a price quote, then place an order.

To uncover the truth about buying computers online, *PC World* sent me on a shopping spree. My mission: to use the Web for everything from researching and ordering products to returning the merchandise for a refund.

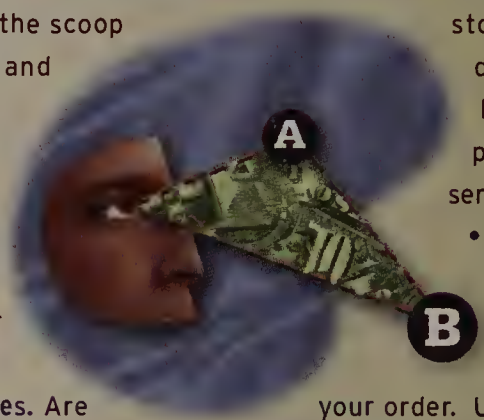
My conclusion? The Web is a great way to find the best bargain, and a convenient way to shop. But when you need customer service, you'll probably still reach for the phone.

IS THE PAGE SECURE? Before you type your Visa number, look for a "secure page" icon in the corner of the window.

Smart Shopping Strategies

SHOPPING ONLINE for computer gear can be quick and painless, as long as you keep a few simple rules in mind:

- **Do your homework.** Before you buy, read online product reviews and check out Usenet groups like alt.comp.hardware and alt.computer to get the scoop from both satisfied and unhappy customers.
- **Compare costs.** Use a shopping service like Computer ESP (www.uvision.com) to find stores that offer the best deals.
- **Research the stores.** Are you dealing with a major retailer or a mom-and-pop shop? How long has it been in business? What's its reputation? Check out BizRate Guide (www.bizrate.com) and other sites that review online retailers.
- **Examine store policies.** Look for stores that offer at least a 30-day money-back guarantee and don't charge a restocking fee. Make sure there's a toll-free customer service number. And check whether technical support is available through the store as well as from the manufacturer.
- **Make contact.** Use the site's e-mail link to ask a specific question, then gauge the store's response. If you don't get a fast answer before you buy, you probably won't get good service afterward.
- **Keep track.** Some sites provide customer and order numbers so you can track the status of your order. Use them. If there's an ordering glitch, you'll want to find out about it as soon as possible.
- **Be security conscious.** Never send credit card or personal information through a site that doesn't support standard security protocols like Secure Sockets Layer. If your browser doesn't support secure links, get one that does.



MY SHOPPING LIST

THE FIRST JOB on the agenda was to buy a power desktop—something I could use for my office. I figured I needed a Pentium MMX-200 with 32MB of RAM, more than 2GB of hard disk storage, a 28.8-kbps or faster fax-modem, a name-brand sound card, and a 17-inch monitor. This was going to set me back at least $3000, I thought, so I wanted to deal with an established vendor—I didn't want to take chances.

I also needed a home machine to share with three game-loving kids and a wife returning to college. I would seek out the best multimedia system I could get for under $2000, again from a name I could trust. Less expensive but equally important items included a Brother HL-730 laser printer, which I picked for its speed, resolution, and sub-$400 price tag; a RAM upgrade and a new modem for my second office machine; a printer cartridge for my color ink jet; and the latest edition of Norton Utilities for Windows 95.

The good news: *PC World* was footing the bill. The bad news: I couldn't keep any of the stuff. But I can dream, can't I?

NET CREDIT: IS IT SAFE?

MY IMMEDIATE CONCERN: Was it safe to send my credit card number off into cyberspace? All the movies I'd seen about teenage computer hackers came reeling through my brain. Somewhere out there, I figured, a low-life phone phreak was trolling for my Visa number. It was enough to send me back to the cash stash under my mattress.

In reality, I had little to worry about. If you take the right precautions, typing your credit card number onto a Web form is probably safer than giving it out over the phone. Most online stores use the Secure Sockets Layer protocol to encrypt your credit card data while it's being transmitted across the Net.

Your browser should indicate whether you're at an SSL site. Netscape Navigator displays a key icon in the lower left corner of the window; if the site isn't secure, the key appears broken. Microsoft Inter-

Mail Order via Modem

These direct-sale PC manufacturers let you configure the system of your dreams, but they don't all let you order it online.

MANUFACTURER	System configuration tool [1]	Order via secure page	Restocking fee	Minimum shipping fee	Estimated shipping time	Ease of use	Comments	Reader service number
Dell www.dell.com	●	●	none	$100	7 to 10 days	outstanding	Excellent support and return policies, pretty good configuration tool.	631
Gateway 2000 www.gw2k.com	●	●	none	$100	7 to 10 days	outstanding	Excellent configuration tool but site offers no information on return policies.	632
Micron www.micronpc.com	●	●	none	n/a	3 to 14 days	very good	Its configuration tool is as good as Gateway's; an all-around excellent site.	633
Polywell www.polywell.com	●	○	15 percent	none	1 to 6 days	fair	Get a quote by e-mail, but no ordering online.	634
Quantex www.qtx.com	●	○	none	$69	14 to 30 days	very good	Very good configuration tool and even a chat room, but you must use the phone to place your order.	635
Sys Technology www.systechnology.com	●	○	up to 15 percent	n/a	5 to 7 days	good	Good configuration tool; 2 percent credit card surcharge disguised as 2 percent discount for cash.	636

● Yes ○ No n/a = not available [1] A form that shows how much a specific configuration will cost. All manufacturers: 901

net Explorer displays a padlock icon in the lower right corner if the site is secure. Also, the URL for a secure page will begin with *https:* rather than *http:*. Every site I bought from used SSL.

But SSL doesn't guarantee perfect security. Because the protocol uses relatively weak 40-bit encryption, a determined hacker could in theory break the code. (A more advanced encryption standard, Secure Electronic Transactions, is in the works but is not yet in use.) Researchers have also recently reported a flaw in the way Web sites transmit information, so that your unencrypted credit card data could get transferred to the next Web host you visit. While we wait for a real solution to this problem, there is a work-around: After you've typed your credit card number, don't click a hyperlink to another page—type the URL instead. That way, your credit info won't get sent along for the ride.

If using a credit card on the Net still makes you nervous, remember that if someone steals your credit info, you can call your bank to remove charges incurred by the thief. And you can always do your research on the Net but make the actual purchase by phone. Some stores may even let you set up an account with your number on file.

THE DIRECT APPROACH

I HAD DECIDED to buy my office power system from a direct vendor—such as Dell, Gateway 2000, or Micron—that sells PCs directly to businesses and consumers rather than through retail outlets.

Right now only a small handful of major vendors are offering their wares on the Web (see "Mail Order via Modem," above). The best ones let you custom-build your system with a choice of name-brand components, update prices on a daily basis, and include shipping charges in the final tally. They also provide an estimated shipping date and detailed information about the company's warranty and return policies.

Remember: Never buy anything—online, on the phone, or otherwise—without reading the fine print. If a company doesn't explain how it handles returns and restocking fees, take your business down the wire to the next store.

You should also check how the store treats its customers *before* you throw money at it. Find the site's e-mail link and ask a question about the store's policies or inventory. If you don't get an ▶

PHOTOGRAPH: AMY ETRA

A LOYAL CUSTOMER

Gerald Harada of Long Beach, California, has bought computer equipment over the wire for the last ten years. Harada, who owns and runs HRH Int'l, a U.S. Customs broker, names NECX Direct as his favorite Internet retailer. Quick response is one reason: "If I order by 3 p.m. on a business day," he explains, "I can get my order the next day because NECX has local warehouses." Harada also likes the fact that he can trace his old orders. "It's a shock sometimes to see how much you've spent over the years," he says.

But Harada doesn't send credit card information over the Web. By phoning in his card number to NECX just once, he obtained a password-protected account.

DELL DIMENSION DESKTOPS FOR BUSINESS

Common features: ◆ Mini Tower Model ◆ 512KB L2 Cache ◆ 2 Universal Serial Bus (USB) Ports ◆ Microsoft® Office 97 Small Business Edition ◆ MS® Windows® 95 ◆ MS Mouse (MS IntelliMouse on XPS System) ◆ 3 Year Limited Warranty† with 1 Year On-site^Δ Service **Upgrades:** ◆ 3Com® 3C905 Fast EtherLink® XL 10/100 PCI Card, add $109. ◆ 4/8GB EIDE TR4 TBU, add $199. ◆ HP LaserJet 6Pse Printer, $799. ◆ 3-Pak of Zip 100MB Cartridges, add $39.

NEW DELL DIMENSION® XPS H266
266MHz PENTIUM® II PROCESSOR

Common features listed above plus:
- 64MB EDO Memory with ECC
- *NEW* 6.4GB Hard Drive with 512KB Cache (9.5ms)
- 1000HS Trinitron® Monitor (15.9" v.i.s.)
- Matrox Millennium 4MB WRAM Video Card
- *NEW* 24X Variable EIDE CD-ROM Drive
- Integrated Yamaha 16-Bit Sound
- Altec ACS-290 Speakers w/Subwoofer
- Iomega Zip 100MB IDE Internal Drive with One Cartridge

$3599

Business Lease◊: $130/Mo.
Order Code #500609

NEW DELL DIMENSION XPS H266
266MHz PENTIUM II PROCESSOR

Common features listed above plus:
- 32MB EDO Memory
- *NEW* 6.4GB Hard Drive with 512KB Cache (9.5ms)
- *NEW* 1000LS Monitor (15.9" v.i.s.)
- Matrox Millennium 4MB WRAM Video Card
- *NEW* 24X Variable EIDE CD-ROM Drive
- Integrated Yamaha 16-Bit Sound
- Altec ACS-90 Speakers
- Iomega Zip 100MB IDE Internal Drive with One Cartridge

$2999

Business Lease: $111/Mo.
Order Code #500608

NEW DELL DIMENSION XPS M233s
233MHz PENTIUM® PROCESSOR WITH MMX™ TECHNOLOGY

Common features listed above plus:
- 32MB SDRAM Memory
- 3.2GB Hard Drive (12ms)
- *NEW* 1000LS Monitor (15.9" v.i.s.)
- *NEW* 4MB EDO ViRGE 3D Video Card
- *NEW* 24X Variable EIDE CD-ROM Drive
- Sound Blaster 16 WaveSynth Wavetable Sound
- Altec ACS-90 Speakers
- Iomega Zip 100MB IDE Internal Drive with One Cartridge

★ *Upgrade to 64MB SDRAM, add $239.*

$2499

Business Lease: $92/Mo.
Order Code #500607

DELL DIMENSION XPS M200s
200MHz PENTIUM PROCESSOR WITH MMX TECHNOLOGY

Common features listed above plus:
- 32MB SDRAM Memory
- 3.2GB Hard Drive (12ms)
- 800HS Trinitron Monitor (13.7" v.i.s.)
- *NEW* 4MB EDO ViRGE 3D Video Card
- 16X Variable EIDE CD-ROM Drive
- AWE32 Wavetable Upgrade Card
- Altec ACS-90 Speakers

★ *Upgrade to a 4.3GB Hard Drive (9.5ms), add $60.*

★ *Upgrade to a 1000LS Monitor (15.9" v.i.s.), add $119.*

$2199

Business Lease: $81/Mo.
Order Code #500606

SYSTEMS THAT BLOW YOUR MIND.

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Upgrades: ◆ HP DeskJet 820Cse Color Printer, add $299. ◆ Iomega Zip 100MB IDE Internal Drive with One Cartridge, add $99. ◆ 3 yrs. On-site Service, add $99.

NEW DELL DIMENSION XPS H266
266MHz PENTIUM II PROCESSOR

Common features listed above plus:
- 64MB EDO Memory with ECC
- *NEW* 6.4GB Hard Drive with 512KB Cache (9.5ms)
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- *NEW* Matrox Millennium II 8MB WRAM Video Card
- *NEW* 24X Variable EIDE CD-ROM Drive
- Yamaha 32 Wavetable Sound
- Altec ACS-490 Full Dolby® Surround Sound Speakers with Subwoofer
- Iomega Zip 100MB IDE Internal Drive with One Cartridge

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NEW DELL DIMENSION XPS M233s
233MHz PENTIUM PROCESSOR W/MMX

Common features listed above plus:
- 32MB SDRAM Memory
- *NEW* 6.4GB Hard Drive with 512KB Cache (9.5ms)
- 1000HS Trinitron Monitor (15.9" v.i.s.)
- Matrox Millennium 4MB WRAM Video Card
- *NEW* 24X Variable EIDE CD-ROM Drive
- Sound Blaster 16 WaveSynth Wavetable Sound
- Altec ACS-290 Speakers with Subwoofer

★ *Upgrade to 64MB SDRAM, add $239.*

$2999

Order Code #500603

DELL DIMENSION XPS M200s
200MHz PENTIUM PROCESSOR W/MMX

Common features listed above plus:
- 32MB SDRAM Memory
- 4.3GB Hard Drive (9.5ms)
- *NEW* 1000LS Monitor (15.9" v.i.s.)
- *NEW* 4MB EDO ViRGE 3D Video Card
- 16X Variable EIDE CD-ROM Drive
- Sound Blaster 16 WaveSynth Wavetable Sound
- Altec ACS-90 Speakers

★ *Upgrade to a 6.4GB Hard Drive with 512KB Cache (9.5ms), add $75.*

★ *Upgrade to Altec ACS-290 Speakers with Subwoofer, add $75.*

$2399

Order Code #500602

DELL DIMENSION M166a
166MHz PENTIUM PROCESSOR W/MMX

Common features listed above plus:
- 16MB SDRAM Memory
- 2.1GB Hard Drive (12ms)
- 800HS Trinitron Monitor (13.7" v.i.s., .26dp)
- 2MB EDO ViRGE 3D Video
- 16X Variable EIDE CD-ROM Drive
- Sound Blaster 16 PnP Sound Card
- Altec ACS-90 Speakers

★ *Upgrade to 32MB SDRAM, add $119.*

★ *Upgrade to a 3.2GB Hard Drive (12ms), add $49.*

$1899

Order Code #500601

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DELL DIMENSION M166a
166MHz PENTIUM PROCESSOR WITH MMX TECHNOLOGY

Common features listed above plus:
- 16MB SDRAM Memory
- 2.1GB Hard Drive (12ms)
- 15LS Monitor (13.7" v.i.s.)
- 2MB EDO ViRGE 3D Video
- 16X Variable EIDE CD-ROM Drive

★ *Upgrade to 32MB SDRAM, add $119.*
★ *Upgrade to a 3.2GB Hard Drive (12ms), add $49.*
★ *Upgrade to an 800HS Trinitron Monitor (13.7" v.i.s., .26dp), add $49.*

$1699

Business Lease: $63/Mo.
Order Code #500605

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MS Office 97 Small Business Edition (SBE) includes:
- Word 97
- Excel 97
- Publisher 97
- Outlook 97
- Automap Streets Plus
- Small Business Financial Mgr 97
- Internet Explorer 3.0

Plus your choice of Bookshelf or Encarta

MS Home Essentials includes:
- Word 97
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- Encarta 97
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- Arcade
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Common features: ◆ 512KB L2 Cache ◆ Integrated Ultra-Wide SCSI-3 Controller ◆ Intel® EtherExpress™ Pro/100 NIC ◆ Intel LANDesk® Server Manager v2.5x ◆ Dell Server Assistant CD ◆ 3 Year Limited Warranty†

DELL® POWEREDGE® 2200 SERVER
266MHz PENTIUM II PROCESSOR
Dual Processor Capable, RAID Capable

Common features listed above plus:
- 96MB ECC EDO Memory
- 4GB Ultra-Wide SCSI-3 Hard Drive [7200 RPM, 8ms] (27GB Max.)
- 8X SCSI CD-ROM Drive
- MS Windows NT® Server 4.0

★ *Upgrade to a 9GB Ultra-Wide SCSI-3 Hard Drive, add $450.*
★ *Upgrade to 128MB ECC EDO Memory, add $220.*

$4999

Business Lease: $179/Mo.
Order Code #250072

DELL POWEREDGE 2200 SERVER
233MHz PENTIUM II PROCESSOR
Dual Processor Capable, RAID Capable

Common features listed above plus:
- 32MB ECC EDO Memory
- 2GB Ultra-Wide SCSI-3 Hard Drive [7200 RPM, 8ms] (27GB Max.)
- 8X SCSI CD-ROM Drive
- 3Com OfficeConnect Hub 8/TPC

★ *Upgrade to 64MB Memory, add $239.*
★ *Upgrade to a 4GB Ultra-Wide SCSI-3 Hard Drive, add $320.*
★ *4/8GB SCSI DAT Tape Backup, add $749.*

$3249

Business Lease: $119/Mo.
Order Code #250070

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***NEW* DELL LATITUDE® LM M166ST**
166MHz PENTIUM PROCESSOR W/MMX

Common features listed above plus:
- 12.1" SVGA Active Matrix Display
- 40MB RAM (72MB Max.)
- 2.1GB Hard Drive
- 2nd Lithium Ion Battery
- MS Office 97 Small Business Edition

★ *Upgrade to 72MB RAM, add $299.*
★ *Motorola 33.6 Fax Modem, add $169.*
★ *3Com LAN+ 33.6 Modem PC Card, add $349.*
★ *Dell Latitude LM Port Replicator, add $159.*
★ *Leather Carrying Case, add $129.*

$3999‡

Business Lease: $144/Mo.
Order Code #800130

***NEW* DELL LATITUDE LM M166ST**
166MHz PENTIUM PROCESSOR W/MMX

Common features listed above plus:
- 12.1" SVGA Active Matrix Display
- 24MB RAM (72MB Max.)
- 2.1GB Hard Drive
- MS Office 97 Small Business Edition

★ *Upgrade to 40MB RAM, add $199.*
★ *2nd Lithium Ion Battery, add $199.*
★ *Motorola 33.6 Fax Modem, add $169.*
★ *Leather Carrying Case, add $129.*
★ *3Com 10Base-T Network Card, add $139.*
★ *Dell Latitude LM Port Replicator, add $159.*

$3599‡

Business Lease: $130/Mo.
Order Code #800132

***NEW* DELL LATITUDE LM M166ST**
166MHz PENTIUM PROCESSOR W/MMX

Common features listed above plus:
- 12.1" SVGA Active Matrix Display
- 16MB RAM (72MB Max.)
- *NEW* 1.6GB Hard Drive
- MS Office 97 Small Business Edition

★ *Upgrade to 40MB RAM, add $299.*
★ *Upgrade to a 2.1GB Hard Drive, add $200.*
★ *2nd Lithium Ion Battery, add $199.*
★ *Motorola 33.6 Fax Modem, add $169.*
★ *Dell Latitude LM Port Replicator, add $159.*
★ *Nylon Carrying Case, add $69.*

$3299‡

Business Lease: $122/Mo.
Order Code #800140

DELL LATITUDE LM P133ST
133MHz PENTIUM® PROCESSOR

Common features listed above plus:
- 12.1" SVGA Active Matrix Display
- 16MB RAM (72MB Max.)
- *NEW* 1.6GB Hard Drive

★ *Upgrade to 24MB RAM, add $100.*
★ *Upgrade to a 2.1GB Hard Drive, add $200.*
★ *2nd Lithium Ion Battery, add $199.*
★ *Motorola 33.6 Fax Modem, add $169.*
★ *Nylon Carrying Case, add $69.*
★ *3Com 10Base-T Network Card, add $139.*

$2799‡

Business Lease: $104/Mo.
Order Code #800138

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answer within three business days, don't buy there.

The first site that I checked was Micron's (www.micronpc.com). It impressed me with its robust configuration tool—an online form where I could select the type of monitor, the size of hard drive, and so on. The price was reconfigured along with my choices, allowing me to mix and match components until I got a system that fit my needs and budget. Unfortunately, at the time I visited the site, Micron did not provide a secure ordering page (it does now), so I moved on.

Gateway 2000 showed a lot more savvy at its site (www.gw2k.com), with an extensive product guide, powerful configuration tools, and secure online ordering. One particularly nice touch: The configuration screen has links to product information, so you can easily get details on, say, the different monitors available. I was sorely tempted by a final price of $2269 for Gateway's MMX-based P5-200, but I passed because it came with an Ensoniq sound card rather than the Creative Labs brand I wanted.

Dell's store (www.dell.com) sports a configuration tool only two clicks from the home page. The site didn't offer as broad a choice of components—for instance, Dell had only four monitor options, compared with Gateway's seven—and Dell prices were slightly higher. Still, an option for a Creative Labs sound card and Dell's superior record in *PC World*'s Reliability and Service survey made it a good choice, so I made my purchase there.

Ordering from Dell was a piece of cake. After clicking the Buy a Dell button on the opening page, I chose one of the Dimension desktop systems listed and entered the custom configuration area, where I selected components from a

Services for Savvy Shoppers

Looking for the best deal? These sites help you compare price and selection across multiple online stores.

COMPANY	Number of stores	System configuration tool [1]	Order via secure page	Selection [2]	Ease of use	Comments
Computer Bargain Hunters www.hom.net/~browder	115	○	○	poor	poor	Shopping can be fun, but you'd never know it from this site's weak design.
Computer ESP www.uvision.com	94	○	○	outstanding	very good	The Yahoo-like listings, lightning-fast searches, and great prices make it a shopper's mind reader.
pcOrder www.pcorder.com	8	●	○	good	poor	Intended mainly for corporate accounts, this site presents an unfriendly face to average shoppers.

● Yes ○ No

[1] A form that shows how much a specific configuration will cost.

[2] Based on percentage of successful finds from a list of common products.

Rating the Online Stores

The best Web outlets carry everything—from PCs and peripherals to

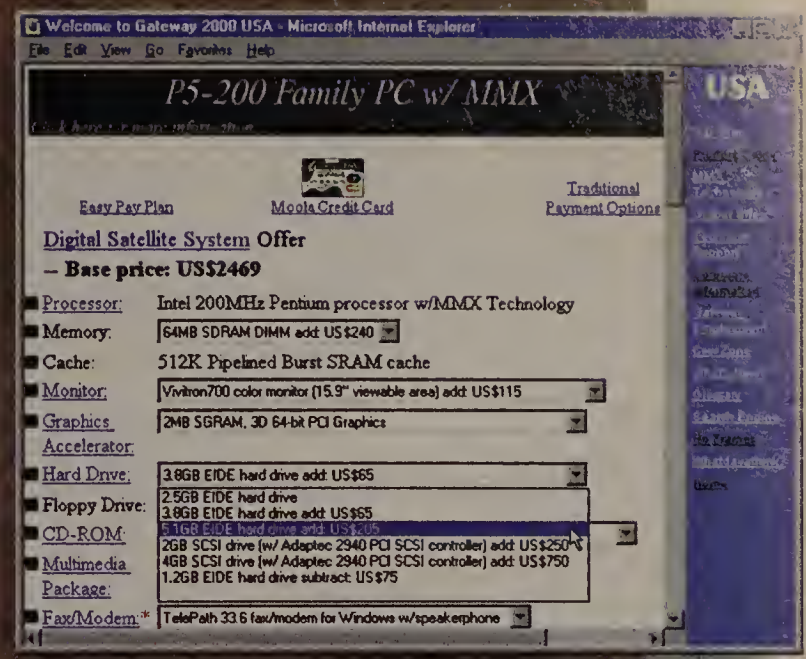
RETAILER	Computer brands carried (as of 5/7/97)	System configuration tool [1]	Order via secure page	Money-back return policy	Restocking fee	Minimum shipping fee
CompUSA www.compusa.com	Acer, AST, Compaq, HP, IBM, Monorail, NEC, Packard Bell, Sony, Toshiba, ZDS	○	●	10 days hardware, 30 days software	none	n/a
ComputAbility www.computability.com	Compaq, HP, IBM, Sony, Toshiba	○	●	30 days	5 percent	$7
Computer Discount Warehouse www.cdw.com	AST, Compaq, HP, IBM, NEC, Sony, Toshiba	○	●	30 days	15 percent	$2.99
Cyberian Outpost www.cybout.com	Acer, AMS, AST, Canon, Hitachi, IBM, NEC, Sharp, TI, Toshiba	○	●	manufacturer must approve return of nondefective items	none	none
CyberWarehouse www.cyberwarehouse.com	AT&T, Canon, Compaq, HP	○	●	30 days	none	none
Egghead www.egghead.com	AST, Sony	○	●	14 days	none	$6.25
Elek-Tek www.elektek.com	Acer, AST, Compaq, HP, IBM	○	●	14 days	none	$4.99
Insight www.insight.com	AST, Compaq, IBM, NEC	○	●	30 days (unopened only)	15 percent	$10
Internet Shopping Network * www.isn.com	Acer, AST, Canon, Compaq, HP, IBM, NEC	○	●	30 days	none	$4.95
Micro Warehouse www.warehouse.com	AST, Compaq, HP, IBM, Monorail, NEC, Toshiba	○	●	30 days for defective items	none	$3
NECX Direct www.necx.com	Acer, AST, Compaq, HP, IBM, NEC, Toshiba	●	●	30 days	up to 50 percent	none
PC Mall www.pcmall.com	Acer, AST, Canon, Compaq, HP, IBM, NEC, Packard Bell, Sony	○	●	manufacturer must approve return of nondefective items	15	$3
PC Shopping Planet www.shoppingplanet.com	Acer, Compaq, HP, NEC, Packard Bell	○	●	30 days for defective items, 5 days for nondefectives	up to 15 percent	none

● Yes ○ No n/a = not available * Recommended [1] A form that shows how much a specific configuration will cost. [2] Based on price comparisons for a list of common products.

series of drop-down menus. I calculated the price by clicking a single button, then clicked the Purchase button to move to a confirmation screen. After double-checking my order, I clicked Purchase to enter an SSL-secure page, where I typed in my credit card info, shipping address, and phone number. As part of the transaction, Dell gave me an order number—an easy way to track my computer's whereabouts as I waited for it to arrive at my door.

I found three other direct vendors with configuration tools—Polywell, Quantex, and Sys Technology. But none of them offered a secure page for placing my order, so I decided to pass.

Overall, buying a system directly through the Web was a far better experience than shopping by phone. I could get clear product descriptions and configure my system quickly and easily, without an aggressive salesperson panting in my ear.



CUSTOM-DESIGN your system using a configuration tool like the one on Gateway 2000's site.

FINDING THE RIGHT STORE

BUT NOT ALL manufacturers sell their systems direct. For example, if you want to buy a PC from Hewlett-Packard, IBM, or Compaq online, you'll have to find a retail site that sells those systems—and not just any store will do. The first rule of computer shopping: Wipe the phrase *impulse buy* from your vocabulary.

You want a store with low prices, fast service, reasonable shipping and handling fees, and a willingness to take something back if you change your mind—without charging a big restocking fee. Here the Internet stands head and shoulders above the world of suburban malls, superstores, and print catalogs, thanks mainly to what I call *shopping services*—sites where you can type in the specs of what you're looking for and get both a list of products and a selection of Web-based stores that sell them.

PC World's parent company, International Data Group, is preparing its own shopping service, called Web Shopper. Other services affiliated with traditional publishing companies include Ziff-Davis's NetBuyer (www.netbuyer.com) and McGraw-Hill's Maven (www.maven.com). I focused my attention on the unaffiliated services.

Computer ESP (www.uvision.com) is one of the better shopping services. Its fine selection of search and comparison tools helps you plow through more than 80,000 pieces of computer gear and accessories in over 90 Web-based stores, including CompUSA, Computer Discount Warehouse, and NECX Direct. Computer ESP's pricing information ▶

software. But check warranties and restocking fees before you whip out the plastic.

Estimated shipping time	Prices [2]	Selection [3]	Ease of use	Comments
n/a	good	fair	good	Wiggly pictures and scrolling marquees sometimes just get in the way—driving to the store is faster.
2 to 5 days	good	outstanding	very good	Good prices and policies make this site an enjoyable and convenient online shopping experience.
2 to 5 days	good	outstanding	outstanding	Less than perfect Web-based customer service hurts otherwise very good site.
1 to 5 days	good	good	very good	You'd better know exactly what you want, because they may not take it back.
5 to 7 days	outstanding	poor	fair	Limited selection—you may not find what you're looking for.
1 to 5 days	outstanding	poor	good	Limited availability and selection, no guarantees—the mall is more fun.
1 to 5 days	good	outstanding	very good	Great selection and easy navigation make this an obvious bookmark for online shoppers.
1 to 5 days	good	outstanding	outstanding	Great inventory and good prices but haphazard customer service.
2 to 5 days	outstanding	outstanding	outstanding	Looks like it was built from the ground up as an Internet site; great all around.
1 to 2 days	outstanding	outstanding	good	Lacks thorough technical information, but otherwise an excellent site.
5 days	good	outstanding	outstanding	Great site if you can get past all the on-screen hype.
1 to 5 days	good	good	very good	Whatever you buy, just make sure it has a manufacturer's money-back guarantee.
1 to 5 days	good	fair	good	No-hassle returns for the do-it-yourselfer.

[3] Based on percentage of successful finds from a list of common products.

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made it easy to pinpoint the best deal among all the stores. The site employs a Java-powered Search Agent tool that does the hunting for you. Even more interesting is the service's Price E-Alert, which notifies you by e-mail when the product you want drops below a certain price.

A quick search through Computer ESP's product list turned up 97 Pentium MMX systems at different online outlets. One button-click sorted the systems by price. Some machines looked like great bargains, but I wasn't about to buy without more research. So I cut the no-name clones and the poorly rated vendors from the list, saved the rest to a file, and kept shopping.

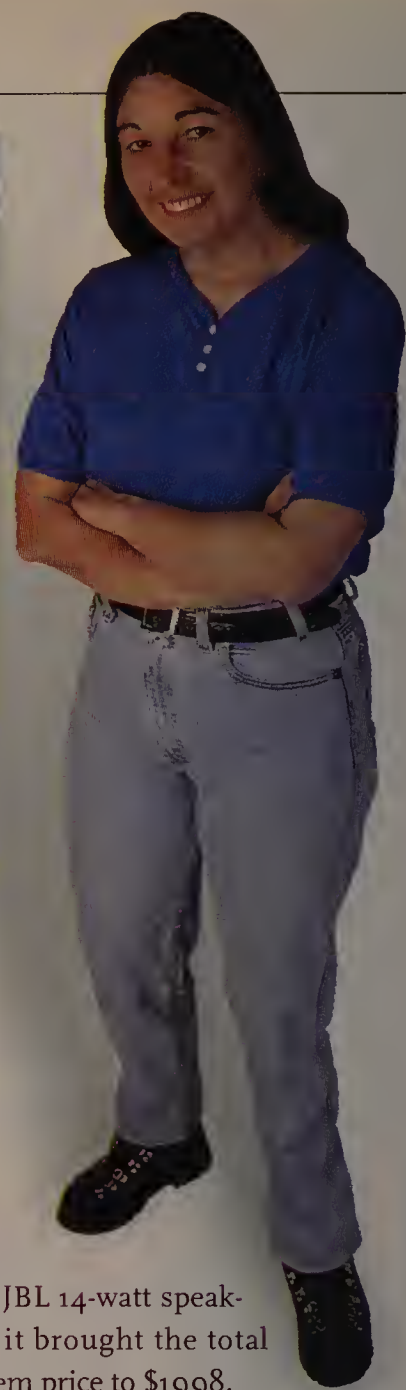
The Internet houses other shopping services, but few match Computer ESP's scope. Computer Bargain Hunters (www.hom.net/~browder) listed only three printer manufacturers in its database—and Brother wasn't one. pcOrder (www.pcorder.com)—a site intended more for corporate accounts than individual users—had an intimidating interface. For example, access to the site's shops is buried three pages deep under a link titled "Powered by pcOrder." It was like standing in front of a store I couldn't enter without a secret handshake.

Shopping services are great for finding the best prices, but they don't they let you gauge a store's overall quality. For that, I turned to the BizRate Guide (www.bizrate.com), which offers reviews of online retailers. BizRate covers everything from contact information to return policies. The site's one flaw is its relatively small scope: At present, it covers only a few major online stores.

A CAREFUL SHOPPER

Sharon Berman doesn't consider herself naive, but she feels perfectly safe buying computer products online. She started ordering from companies she had dealt with previously over the phone—Computer Discount Warehouse and Egghead—but says she has no problem now buying from other vendors as well.

That's not to say that Berman, a machinist with General Motors in Tonawanda, New York, doesn't do her homework. "As a rule, I am not an impulse buyer," she says. She reads reviews, visits local stores before buying hardware, and downloads software demos from publishers' Web sites. And just to be absolutely safe, she uses a single credit card for all her online purchases so she can easily pinpoint any problems that arise.



HITTING THE STORES

OKAY. I'D FIGURED OUT what system I wanted, what I could expect to pay, and the best places to start looking. It was time to hit the stores.

My first stop was NECX Direct (www.necx.com). Lurking beneath the Computer Superstore link was a well-organized online catalog. Scrolling headlines and highlighted bargains give the feel of a real-world superstore, and the low prices certainly make the site tempting. But I wasn't quite ready to whip out my credit card, so I surfed on.

I struck gold—and learned a hard lesson in Internet economics—while visiting what would become one of my favorite shopping sites, Elek-Tek (www.elektek.com). I did a quick hunt for 'MMX' using the site's search tool and hit pay dirt with an Acer Aspire 2731 Pentium MMX-166 for $1560; when I added a CTX 15-inch monitor and JBL 14-watt speakers, it brought the total system price to $1998.

I thought for sure I had found my home system, so I bookmarked the page and shopped around for other gear. That was my first mistake. When I returned a couple of days later, Elek-Tek had raised the price on the Acer to $1699—still a good buy, but adding in the peripherals put it beyond my $2000 limit.

I ended up at Insight (www.insight.com), the online retail companion to the big mail-order house. I reveled in the site's almost overwhelming selection and helpful category listings.

Insight's "configuration" screen let me specify only product category, manufacturer, and price, but by this time I'd already settled on an IBM Aptiva C33 as my new home system. When I added a 17-inch Princeton Graphics monitor, the system came in just under my $2000 limit. I clicked over to Insight's checkout page and made the purchase. This, I would later discover, was mistake number two (see "Tracking the Order"). ▶

Search Results - Microsoft Internet Explorer

Product Search Results

The list of products that matched your query of MMX is shown below.

Manufacturer	Product Name	Price	SKU	In Stock	Add to Cart
Acer	Aspire 4 2731 Pentium® 166 With MMX Technology 16MB/2.0GB	$1,599.00	#204892	✓	Add
Acer	ASPIRE 4 P/200MMX 32/2.0GB	$1,899.00	#204909	✓	Add
Books that Work	VISUAL HOME DELUXE MMX CD	$49.99	#222472		Add
Compaq Computer Corp	DESKPRO 6000 P166/MMX/2150/PDS	$3,179.00	#218827		Add
Compaq Computer Corp.	DESKPRO 6000 P200MMX/32MB/4.2	$4,049.00	#221177		Add
Compaq Computer Corp.	PRES 4784 P/200MMX 32/4.3GB	$2,399.00	#206492		Add
Compaq Computer Corp.	PRES 6772 P/200MMX 48/6.5GB	$2,799.00	#206509		Add

FINDING A BARGAIN MMX system couldn't be easier, thanks to online stores like Elek-Tek.

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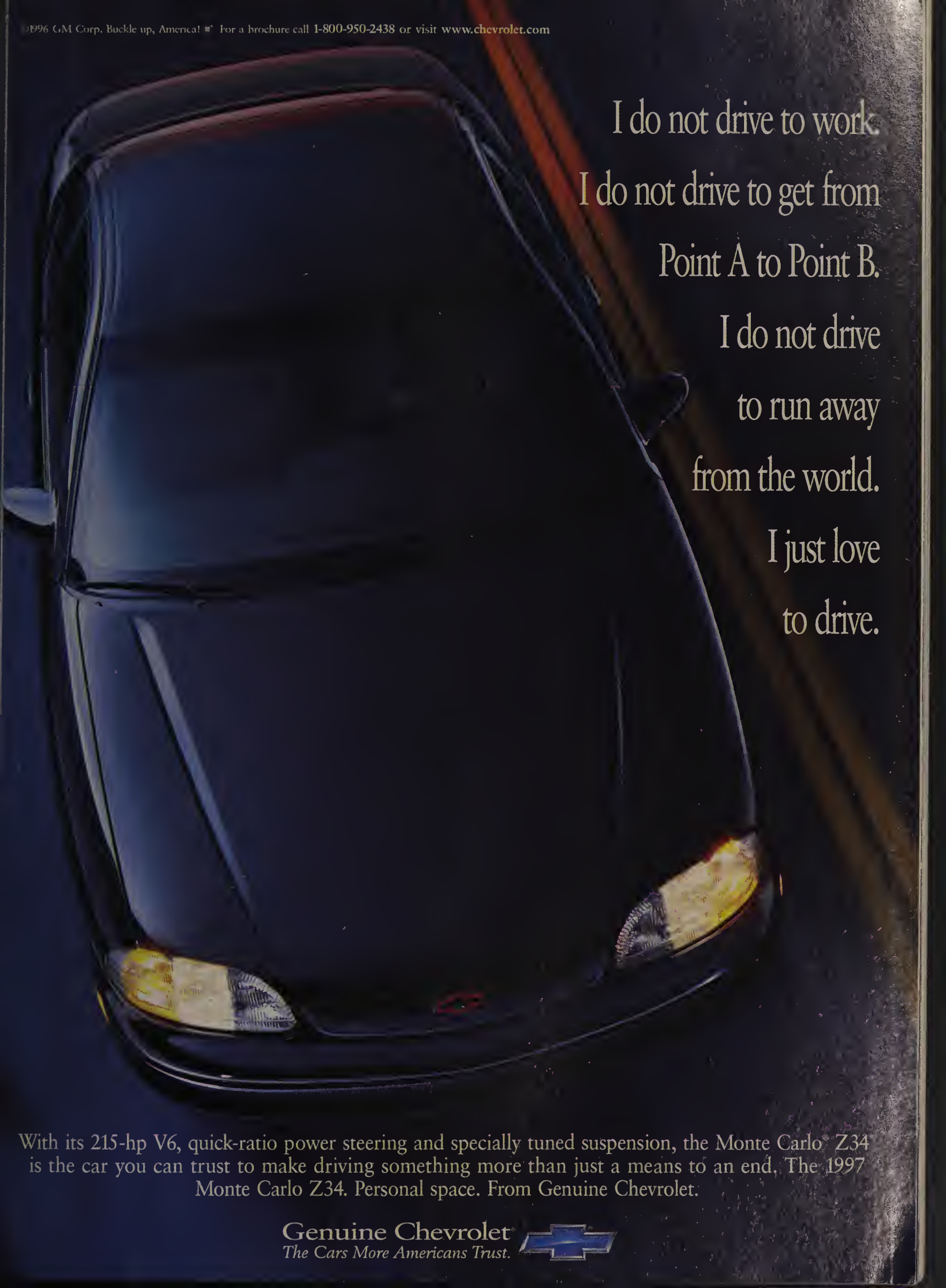


PRINTERS, RAM, AND MORE

MY SHOPPING CONTINUED through several more sites. Computer Discount Warehouse (www.cdw.com) had one of the quickest and most accurate search engines. I snagged the Brother HL-730 laser printer for a very reasonable $399 and kept moving.

Micro Warehouse came next (www.warehouse.com). The site looks a lot like the paper catalog. Its lack of a configuration screen makes it less useful for system shopping, but I easily found the modem I was looking for, at a very good price.

For the small items on my list—an ink cartridge for my printer and a memory upgrade for my computer—I landed my browser on PC Shopping Planet (www.shoppingplanet.com). Because this store bills itself as an upgrade specialist, I expected (and got) good prices on consumables and RAM. I also appreciated PC Shopping Planet's "No Hassle Return" policy—the store even sends along a UPS shipping label with your order, making it easier to send products back.

For my software purchase, I went strictly by price. I went with ComputAbility (www.computability.com); its $68 tag on Norton Utilities for Windows 95 beat everybody else's, although the $7.70 I paid for shipping and handling pretty well wiped out the savings. There's a lesson here for Internet and mail-order shoppers: Because the majority of online stores charge a $3 to $10 minimum shipping fee, buying only a single low-cost item isn't worthwhile.

TRACKING THE ORDER

SO FAR, MY SHOPPING SPREE hadn't hurt too much. But as the bills mounted and the packages started to arrive, flaws in a generally painless shopping experience began to emerge.

For example, the tracking system at Insight simply dropped my Aptiva order into a black hole. After three days without receiving a confirmation, I called Insight and learned that my order was held up due to a snafu with a maxed-out credit card. I could have fixed the problem with a call to my bank, but I was so irritated with Insight that I canceled the order outright.

Computer Discount Warehouse also fell short when I inadvertently ordered the same printer twice. I sent e-mail to customer service to cancel the second order but still received confirmation calls for both sales the next day. I explained the situation twice to two people, and both assured me that the second order had been canceled. Three days later, both printers showed up at my door. In the end, however, the store refunded the entire purchase amount on both printers, plus shipping charges for each. CDW also skipped the usual restocking fee—a very nice way to apologize.

Some Web stores treated me right from the get-go. Dell, for instance, e-mailed me confirmation, then called the day after I placed my order to verify my purchase. Then Dell called again to resolve another problem with a maxed-out credit card. (Hey, when you go on a $6000 shopping spree, these things happen.)

MIXED RETURNS

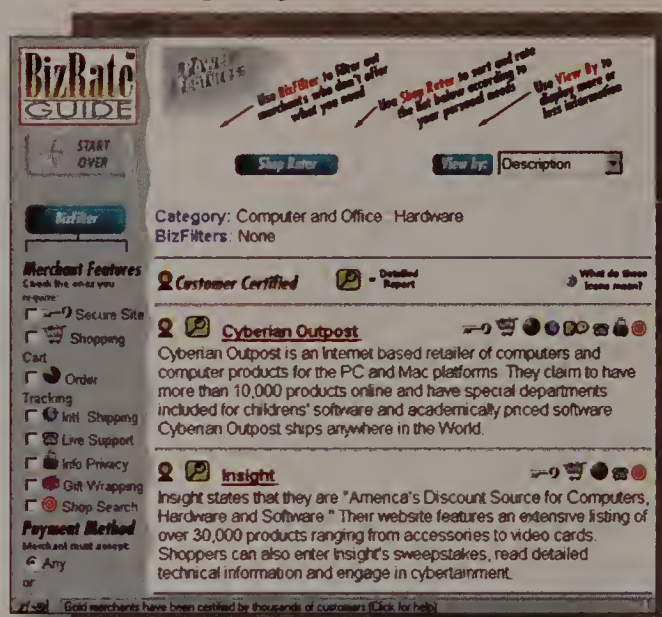
WHEN IT CAME TIME to return the products I'd bought, my experience was mixed. With Dell, a single phone call was all I needed to get a refund (minus shipping charges) for an entire system, and nobody tried to talk me out of it or to sell me a different model.

PC Shopping Planet socked me with a 5 percent restocking fee, but that's still better than the fees some stores charge. And I steered completely away from Cyberian Outpost (www.cybout.com) and PC Mall (www.pcmall.com); their return policies state that they accept returns only when the manufacturer guarantees money-back satisfaction.

By now I'd shopped for so long, my fingers were numb and my retinas were lumps of charcoal. But the results were worth it. No other shopping method offers a way to compare prices and specs for so much gear in such a short time.

All things considered, buying computer gear on the Web is a great way to go. Next time I need to upgrade my systems, I'll go online first—even if I have to spend my own money to do it.

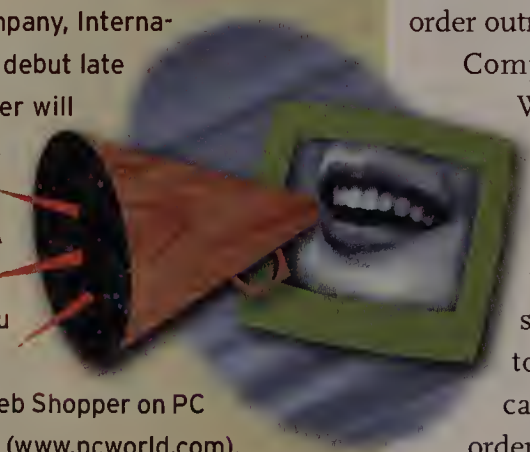
Peter Scisco has been writing about personal computers, online services, and software for more than ten years. ■



WHO'S MINDING THE STORES? Check BizRate Guide for the inside dope on the best (and worst) places to shop online.

@ Your Service

ATTENTION, SHOPPERS: There's a new Web shopping service that should give Computer ESP, pcOrder, and the rest a run for your money. Web Shopper, which is owned by *PC World*'s parent company, International Data Group, should debut late this summer. Web Shopper will offer access to *PC World*'s Top 100, plus news and real-time price updates. A collection of searchable reviews will help you zero in on the gear you need. You'll find links to Web Shopper on PC World Online's home page (www.pcworld.com).



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Talk about outstanding performance for the price and one name is sure to dominate the conversation. Micron. That's because our company offers so many desktop, PC server and portable options, expressly designed to meet your computing demands. At home. At the office. Or on the road. You see, we don't compromise when it comes to technology. Our engineers are driven by a commitment to performance and reliability. And every Micron™ system is custom configured at one of the industry's most advanced manufacturing facilities built to reflect our tradition of excellence and commitment to quality.

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* The Micron TransPort VLX comes with a 5-year/1-year limited warranty.

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Award-winning Pentium® processor-based technology, an outstanding selection of software and competitive pricing make this a welcome addition to any family.

STANDARD FEATURES

512KB pipeline burst cache, flash BIOS
3.5" floppy drive
100MB Iomega Zip drive
32 voice wavetable stereo sound with speakers
Advent AV270 2x25 watt stereo speakers in P200 only
33.6 fax/modem, speakerphone, voice mail
Microsoft® Phone telephony software
Internet ready: SPRYNET Internet trial membership, Microsoft Internet Explorer™
America Online and CompuServe trial memberships
PCI 64-bit 3D video, MPEG, 2MB EDO RAM
Tool-free minitower or desktop
Microsoft Mouse, 104-key keyboard
Microsoft Windows® 95 and MS® Plus! CD
Microsoft Works CD
SystemSoft SystemWizard application for automated problem resolution
Quicken Financial Pak: Quicken Deluxe, Quicken Financial Planner, Quicken Parents' Guide to Money, Quicken Family Lawyer
Family Pak: ABCs by Dr. Seuss, Thinkin' Things Collection 1, Earthworm Jim and Mechwarrior 2
Microsoft Home Pak
5-year/3-year Micron Power℠ limited warranty

HOME MPC P166

Intel 166MHz Pentium processor
16MB EDO RAM
2.1GB EIDE hard drive
12X EIDE CD-ROM drive
15" Micron 15FGx, .28dp (13.7" display)

$1,599

With Intel 200MHz Pentium processor with MMX™ technology — add $300
With Intel 166MHz Pentium processor with MMX — add $100

HOME MPC P200

Intel 200MHz Pentium processor
32MB EDO RAM
3.1GB EIDE hard drive
16X EIDE variable speed CD-ROM drive
17" Micron 17FGx, .26dp (15.8" display)

$2,249

With Intel 200MHz Pentium processor with MMX — add $100
With Intel 166MHz Pentium processor with MMX — subtract $100

MICRON POWERDIGM™

This new Intel-based workstation punches through the most daunting 32-bit applications.

STANDARD FEATURES

256KB internal L2 cache, flash BIOS
12X SCSI CD-ROM drive
3.5" floppy drive
PCI 32-bit Ultra Wide SCSI-3 controller
Iomega Jaz SCSI drive with 1GB removable cartridge
32 voice wavetable stereo sound with speakers
Number Nine Imagine 128 series II video card, 4MB VRAM
3Com® 3C905 Fast EtherLinkXL 10/100 PCI TPO network adapter
Tool-free minitower
Microsoft Intellimouse, 104-key keyboard
Microsoft Windows NT® Workstation
5-year/3-year Micron Power℠ limited warranty

MICRON POWERDIGM XLI

Dual Intel 200MHz Pentium Pro processors
64MB ECC EDO RAM
4GB Ultra Wide SCSI-3 hard drive
19" Hitachi SuperScan CM751, .26dp color monitor (18" display)

$5,499

Bus. lease $173/mo.

OPTIONS

MULTIMEDIA OPTIONS

32 voice wavetable stereo sound card	$59 [1]
32 voice wavetable stereo sound card with 2MB RAM	$99 [1]
Advent AV270 Powered Partners stereo speakers	$79
Advent AV370 Powered Partners stereo speakers with subwoofer	$199
Microsoft SideWinder™ 3D Pro joystick	$59
Microsoft SideWinder gamepad	$39

STORAGE/MEDIA OPTIONS

Adaptec 2940U Ultra SCSI Fast-20 controller (upgrade from system with standard Ultra SCSI Fast-20 controller)	$100
Plextor 12PleX 12X 1.8MBps SCSI internal CD-ROM drive (upgrade from systems with standard 12X EIDE CD-ROM drive)	$200 [2]
Iomega Jaz SCSI drive with 1GB removable cartridge	$399 [2]
Iomega ZIP IDE drive with 100MB removable cartridge	$99
Iomega 6-pack of 100MB Zip cartridges	$99
Iomega Ditto 2000 (1/2GB) Travan tape backup drive with tape	$149
Iomega Ditto 3200 (1.6/3.2GB) Travan tape backup drive with tape	$199
Sony 4/8GB SCSI DDS-2 tape backup drive with tape	$749 [2]
Seagate Backup Exec	$249
Mylex dual channel Ultra SCSI-3 RAID caching controller with 4MB RAM	$899

NETWORKING OPTIONS

3Com 3C509B EtherLink III ISA combo network adapter	$79
3Com 3C900 EtherLinkXL PCI combo network adapter	$99
3Com 3C905 Fast EtherLinkXL 10/100 PCI TPO network adapter	$99
3Com OfficeConnect Hub 8/TPC	$149
3Com OfficeConnect Switch 140	$969

COMMUNICATION OPTIONS

33.6 internal data/fax modem	$139 [3]
33.6 internal data/fax modem, speakerphone, voice mail	$159 [4]
33.6 external data/fax modem	$299

HP PRINTERS

HP DeskJet 692c printer	$329
HP LaserJet 5L-FS printer	$419
HP DeskJet 870 Cxi printer	$509
HP LaserJet 6P printer	$799

Price includes cable. Additional DeskJet/LaserJet models available. Please call for details.

SOFTWARE OPTIONS

EdVenture Pak: Sheila Rae the Brave, Putt-Putt Saves the Zoo, Reader Rabbit's Reading Development Library 1, Freddi Fish and the Case of the Missing Kelp Seeds, and the Thinkin' Things Collection 2 (available only on desktop and notebook systems with Microsoft Windows 95 and CD-ROM)	$69
Quicken Financial Pak: Quicken Deluxe, Quicken Financial Planner, Quicken Parents' Guide to Money, Quicken Family Lawyer (available only on desktop and notebook systems with Microsoft Windows 95 and CD-ROM)	$69

DISPLAY/VIDEO OPTIONS

17" Hitachi SuperScan 1711 (15.9" display) .26dp color monitor	$150 [5]
21" Hitachi SuperScan CM801 (20" display) .26dp color monitor	$650 [5]
Number Nine Imagine 128 series II video card, 4MB VRAM	$299 [6]
Number Nine Imagine 128 series II video card, 8MB VRAM	$549 [6]

EXTENDED DESKTOP SERVICE OPTIONS

Optional 1st year on-site service[7] coverage included	
2nd year on-site service[8] coverage (with system purchase)	$79
2nd year on-site service[8] coverage (after system shipment)	$99
2nd and 3rd year on-site service[8] coverage (with system purchase)	$99
2nd and 3rd year on-site service[8] coverage (after system shipment)	$139

DIGITAL CAMERAS

Kodak Digital Science DC20 camera	$199
Kodak Digital Science DC25 camera	$499
Kodak Digital Science DC50 zoom camera	$699

OTHER OPTIONS

APC Per7T surge suppressor	$39
APC Pro7T surge suppressor	$59
APC Smart-UPS 700 with PowerChute plus software	$389
APC Smart-UPS 1000 with PowerChute plus software	$529
Microsoft Natural Keyboard® (upgrade from standard keyboard)	$49

[1] Upgrade from systems with standard 16-bit stereo sound card
[2] Requires SCSI host adapter
[3] Modem includes trial memberships to CompuServe and America Online
[4] Modem includes trial memberships to CompuServe and America Online, requires sound card
[5] Upgrade from systems with standard Micron 17" 17FGx color monitor
[6] Upgrade from systems with standard 64-bit 2MB video card
[7] 1st year on-site service is available in the United States and in limited areas in Canada from third-party service provider per customer's agreement with provider
[8] 2nd year and 2nd and 3rd year offerings are available in the United States only

Some options and accessories available with system purchase only

A COMMITMENT TO EXCELLENCE.

In a world where big-name performance, reliability and service are slipping, our customers and industry experts have voted to honor Micron with over 100 awards. And that's just in the past two years.

You see, we're committed to delivering computers that perform better and run trouble-free longer than any other. And if support is ever needed, we're there to make things right for you, anytime of the day or night. Finally, your Micron PC comes backed by our industry-leading Micron Power℠ warranty. It all makes for very strong computers. And very satisfied customers. You have our word on that. Call today.

EXCELLENCE IS A CLICK AWAY.

Click on www.micronpc.com for easy access to the most up-to-date and detailed information about our award-winning PCs. Take advantage of special Web site-exclusive features. And fast technical support. Visit today to find a Micron system built with your needs in mind.

UNCOMPROMISING TECHNOLOGY.

Performance rules with Micron. Only the hottest, most current technology goes into the system that's right for you. No compromises. With Micron, you get optimal performance for the price. Period.

THE MILLENNIA™ MME.

The Millennia MME rockets desktop performance to a whole new world of computing power with an Intel 200MHz Pentium® processor with MMX™ technology, Intel's TX chip set and SDRAM. Speed and productivity are enhanced as never before. No compromises here. This remarkable machine also puts on an awesome display of multimedia power with a 3D video adapter, MPEG and wavetable sound. Want more good news? The Millennia MME is designed to make upgrades a snap. So what starts out as a superior PC can stay that way.

PENTIUM® PROCESSOR WITH MMX™ TECHNOLOGY. EXPANDING THE WORLD OF MULTIMEDIA.

All the great things the Intel Pentium processor does for performance, the Pentium processor with MMX technology does better. Modem operations. 2D and 3D graphics. Video. Audio. The Internet. Memory. Video conferencing and whiteboard collaboration. MMX technology gives the entire system a boost in performance like never before.

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MICRON MILLENNIA™

The Millennia family offers you an enlightening combination of performance and features to suit any budget.

MICRON MILLENNIA MME P200

STANDARD FEATURES

512KB pipeline burst cache, flash BIOS
16X EIDE variable speed CD-ROM drive
3.5" floppy drive
100MB Iomega Zip drive
32 voice wavetable stereo sound with speakers
56Kbps technology modem*
PCI 64-bit 3D video, MPEG, 4MB EDO RAM
Tool-free minitower or desktop
Microsoft® Intellimouse, 104-key keyboard
Microsoft Windows® 95 and MS® Plus! CD
Microsoft Office 97 SBE CDs
Multimedia Xcitement Pak
(comprised of MMX technology-based software)
2 USB connectors
5-year/3-year Micron Power℠ limited warranty

Intel 200MHz Pentium® processor with MMX™ technology
16MB SDRAM
2.1GB EIDE hard drive
15" Micron 15FGx, .28dp (13.7" display)
$1,959
Bus. lease $67/mo.

Intel 200MHz Pentium processor with MMX
32MB SDRAM
3.1GB EIDE hard drive
17" Micron 17FGx, .26dp (15.8" display)
$2,399
Bus. lease $82/mo.

Intel 200MHz Pentium processor with MMX
64MB SDRAM
4GB EIDE hard drive
17" Micron 17FGx, .26dp (15.8" display)
$2,659
Bus. lease $91/mo.

MICRON MILLENNIA MME P200 PLUS

STANDARD FEATURES

512KB pipeline burst cache, flash BIOS
PCI 32-bit Ultra SCSI Fast-20 controller
12X SCSI CD-ROM drive
3.5" floppy drive
100MB Iomega Zip drive
32 voice wavetable stereo sound with speakers
56Kbps technology modem*
PCI 64-bit 3D video, MPEG, 4MB EDO RAM
Tool-free minitower or desktop
Microsoft Intellimouse, 104-key keyboard
Microsoft Windows 95 and MS Plus! CD
Microsoft Office 97 SBE CDs
Multimedia Xcitement Pak
(comprised of MMX technology-based software)
2 USB connectors
5-year/3-year Micron Power℠ limited warranty

Intel 200MHz Pentium processor with MMX
32MB SDRAM
4GB SCSI hard drive
17" Micron 17FGx, .26dp (15.8" display)
$3,159
Bus. lease $108/mo.

MICRON MILLENNIA PRO2 200

STANDARD FEATURES

Supports dual Intel 200MHz Pentium Pro processors
256KB internal L2 cache, flash BIOS
16X EIDE variable speed CD-ROM drive
3.5" floppy drive
100MB Iomega Zip drive
16-bit stereo sound and speakers
PCI 64-bit 3D video, MPEG, 4MB EDO RAM
Tool-free minitower or desktop
Microsoft Intellimouse, 104-key keyboard
Microsoft Windows 95 and MS Plus! CD
Microsoft Office 97 SBE CDs
5-year/3-year Micron Power℠ limited warranty

Intel 200MHz Pentium Pro processor
32MB EDO RAM
3.1GB EIDE hard drive
56Kbps technology modem*
15" Micron 15FGx, .28dp (13.7" display)
$2,299
Bus. lease $78/mo.

Intel 200MHz Pentium Pro processor
64MB EDO RAM
4GB EIDE hard drive
17" Micron 17FGx, .26dp (15.8" display)
$2,799
Bus. lease $96/mo.

Intel 200MHz Pentium Pro processor
64MB EDO RAM
4GB SCSI hard drive
12X SCSI CD-ROM drive
PCI 32-bit Ultra SCSI Fast-20 controller
17" Micron 17FGx, .26dp (15.8" display)
$3,499
Bus. lease $119/mo.

*Maximum transmission speed of up to 56Kbps when downloading data and 33.6Kbps when uploading. However, actual performance is dependent upon numerous factors and observed transfer rates may be less than the maximum potentials.

MMX™ intel inside pentium® PROCESSOR

intel inside PENTIUM® PRO PROCESSOR

intel inside pentium® PROCESSOR

ASSURANCE DOWN THE ROAD.

Micron is a company driven by performance and reliability. Our commitment to building better engineered computers shows. In the past two years, we've collected over 100 awards for product performance, customer service and reliability.

Source: *PC World* best overall PC company for reliability and service, December 1996.

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If we didn't believe so strongly in the quality of our products, we wouldn't back them with such an outstanding warranty. The Micron Power warranty provides coverage with 5-year protection on microprocessors and main memory where most other companies give you three. Our industry-leading warranty offers a 30-day money-back policy. Plus 24-hour technical support.

MICRON POWER℠ WARRANTY

5-year limited warranty on microprocessor and main memory
3-year limited parts-only system warranty (1-year for TransPort VLX)
1-, 2- or 3-year optional on-site service agreement for Micron desktop and server systems
30 days of free Micron-supplied software support for Micron desktop systems; 3 optional network operating system incident resolutions included for Micron server systems
30-day money back policy
24-hour technical support

The foregoing is subject to and qualified by Micron's standard limited warranties and terms and conditions of sale. Terms and conditions of sale may vary for specific configurations. Copies of the limited warranties may be obtained on our Web site or by calling Micron.

Designed for Microsoft® Windows® 95

PC WORLD — DECEMBER 1996 BEST OVERALL COMPANY

PC MAGAZINE EDITORS' CHOICE — FEBRUARY 1997 MICRON MILLENNIA MXE P200

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By Dan Littman and Eric Hellweg

33.6 and getting faster

HIDDEN INSIDE your computer is the device that connects you to the world: your modem. If you use it often, we're willing to bet that your biggest complaint is about speed. Now you're thinking about upgrading, and all you hear is the buzz around the new 56-kbps modems. Should you run out and buy one?

56-kbps technology is a classic case of buyer beware. There are some critical facts you need to know before you buy. First, 56k modems are different from conventional modems in that they can run at top speed only when downloading from a compatible server. When uploading or communicating with another modem—56-kbps or otherwise—they can go no faster than 33.6 kbps.

Second, the technology is tied up in a standards war that may take a year or more to settle. Currently two protocols are available: ▶

Sure, new 56-kbps modems are hitting the highway, but they may not take you everywhere you want to go. Your best bet for cruising the Net is still a 33.6k modem. We review ten and pick two reliable models **ready to drive off the lot.**

PHOTOGRAPHS BY GEOFF SPEAR

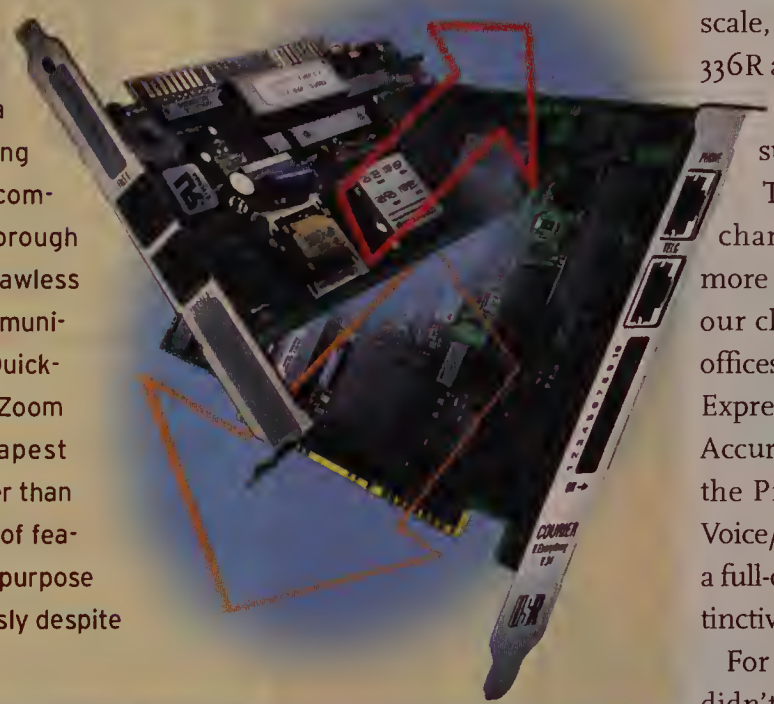
K56flex, proffered by Rockwell/Lucent, and U.S. Robotics' x2. You need to know which flavor your Internet service provider supports before you choose a 56-kbps modem. The phone line itself could be a problem. Some may not be able to handle a 56-kbps connection. If at all possible, try before you buy.

Vendors' difficulties with getting 56-kbps out the door were surprising. We originally intended this story to be a roundup of both 56-kbps and 33.6-kbps modems. But by the time we were knee-deep in testing, none of the promised internal 56k products had shown up. The early K56flex modems got off to a false start due to problems with the Rockwell chip set. And at that time, even U.S. Robotics did not have an internal x2 modem ready. Developments were slow at the server end of the 56k line as well. Other than at U.S. Robotics headquarters, we couldn't find any 56k servers to dial in to. It was only as we were wrapping up testing for this story that ISPs with 56k came online and we started to receive a variety of 56k products. We ran some informal tests of these latecomers over live phone lines, and they were significantly faster at downloading—about 43 percent overall—than 33.6-kbps modems (see "56k Versus 33.6: A Leap Ahead"). By the time you read this, a bunch of new K56flex and x2 modems should be hitting store shelves, and ISP support is growing. Look for a roundup of 56k modems in an upcoming issue.

BEST BUYS

USR, Zoom at the Top

THE $215 U.S. ROBOTICS Courier V.Everything offers toll-free tech support and a well-rounded list of extras, including FlashROM and distinctive ring. It compensates for its high price with thorough and accessible documentation, a flawless installation, and one of the best communications software packages around, QuickLink II. Our other Best Buy, the $89 Zoom FaxModem V.34I Plus, is the cheapest modem on the chart. It's a little faster than the USR but doesn't have its range of features. The Zoom is a great general-purpose budget modem and installed flawlessly despite its non-Plug and Play status.



33.6 IS STILL THE SAFE BET

FOR MOST PEOPLE who want to upgrade immediately, the safest bet is an analog 33.6-kbps modem. They work just like your old 14.4-kbps modem, only much faster. Plenty of models are available. For this review, we tested 14 internal modems from Amquest, Boca Research, Diamond, E-Tech, Hayes, IBM, Practical Peripherals, Shark, U.S. Robotics, Wisecom, and Zoom, ranging in price from $89 to $249.

We awarded Best Buys to the U.S. Robotics Courier V.Everything and the Zoom FaxModem V.34I Plus because they represent the best combination of speed, price, and features. The Courier lacks voice capabilities but comes with one of the best software packages around, QuickLink II. It's also FlashROM upgradable. The Zoom's features are very basic, but it tied for second fastest performance and was dirt cheap—less than $90. Both U.S. Robotics and Zoom back their modems with great support packages. USR offers toll-free support, while Zoom provides a lengthy seven-year warranty. Both companies will ship you a new unit if yours stops working—reassuring if your modem serves as the lifeline for your business.

The Hayes Optima 336B Internal Business Modem is the fastest performer on the chart and has a nice sampling of features, but at $249 it's expensive. At the other end of the price scale, the Shark Multimedia Baby Tiger 336R and Wisecom Accelerator IV 33600 Voice Internal are cheap, but their support policies could be better.

The other modems on the Top 10 chart (see page 257) are suitable for more specific needs. Three modems on our chart fit the bill for small or home offices: the Diamond Multimedia Supra-Express 336i Sp with ASVD, the Hayes Accura 336 Total Gaming Solution, and the Practical Peripherals Practical 336 Voice/Data/Fax. All three have voice mail, a full-duplex speakerphone, Caller ID, distinctive ring, and cross-ship replacement.

For reviews of the four modems that didn't make this month's Top 10 chart, and a discussion of software modems, check out *PC World's* Web site at www.pcworld.com/t10modems.

PERFORMANCE: A CLOSE RACE

WE DIDN'T FIND any earthshaking differences in performance among our Top 10 modems, but if you plan to transfer lots of big files, there are some clear choices. The fastest, the Hayes Optima, was about 19 percent faster than the slowest, the Practical Peripherals Practical 336 Voice/Data/Fax. That's a difference of about 30 seconds per megabyte of data. See the Test Report for the performance results of all the Top 10 modems.

A note about the Test Report: We list an "effective transfer rate" along with the time to transfer a megabyte of data. All the modems connect at up to 33.6 kbps, but they also compress files before sending them over the wire. One reason we use different types of files is the range of compressibility they represent. If a 33.6-kbps modem can compress a file to half the original size, for instance, it can transfer twice the amount of data in the same time—or at 67.2 kbps, its effective transfer rate.

PLUG AND PLAY, NOT; FEATURES, YEP

DON'T RELY ON Plug and Play certification from Microsoft when looking for an easy installation. Eight of the 14 modems we tested were Plug and Play certified. Instead of encountering eight no-brainer installations and six hair-pullers, we entered into a kind of topsy-turvy Plug and Play wonderland where Plug and

Play sometimes worked and sometimes didn't. For example, Boca Research's 33.6 Game/Business Modem and Wisecom's Accelerator IV, both Plug and Play certified, earned poor ratings for ease of installation. On the other hand, three of the non–Plug and Play modems—the Amquest 33600 HyperModem Voice, the Zoom, and the Shark—were simple to set up.

While the average price of a modem dropped from $173 to $139 over the last six months, they now come with many more features. Here's what to look for.

DSVD or ASVD. Digital or analog simultaneous voice and data lets you transfer data at the same time you speak over the phone line. A networked gamer's dream.

VoiceView. This lets you switch between voice and data in the same call. It's useful for support calls and telecommuting.

FlashROM. This lets you upgrade your modem through a software download, usually containing new features or bug fixes.

Voice mail. If you run a business, a modem-based voice-mail system is more flexible than your typical answering machine.

Full-duplex speakerphone. With this feature, you don't need to wait for the other person to stop talking before you begin.

Caller ID. Using this service with support from your phone company means that when a call comes in, the caller's number will show on your screen.

Distinctive ring. This service requires support from your local phone company. When a call comes in, the modem determines what type it is—a fax, a data transfer, or a regular voice call—and routes it to the appropriate location.

So which modem is right for you? The final decision comes down to what you'll use the modem for most. Telecommuting? Go for speed. Small business? Go for features. Just need a modem to get e-mail from friends and family? Look for the budget boards. Web browsing? Wait for our 56k reviews. ▶

56k Versus 33.6
A Leap Ahead

JUST AS WE finished this roundup, two K56flex modems arrived on our doorstep. The Diamond Multimedia SupraExpress 56k and the Motorola ModemSurfr 56k are the first models we've received that support the Rockwell/Lucent 56-kbps protocol. At about the same time, MaxTech sent us its NetPacer Pro 56k, the first non–U.S. Robotics modem we've received that supports the competing x2 protocol. We already had the U.S. Robotics Sportster Faxmodem 56K and the Courier V.Everything 56k.

With modems representing both 56-kbps protocols and a bunch of 33.6-kbps modems in-house, we naturally turned to the $64,000 question: Just how much faster are the 56-kbps modems at downloading files than your average 33.6-kbps modem? Based on our tests, calling over live phone lines (currently the only way to test 56-kbps), the answer is, about 43 percent faster. The four 56-kbps modems downloaded our test files in an average of 3 minutes and 17 seconds per megabyte. (We didn't include the Motorola in our final test results because of problems with the modem's early drivers.) A typical 33.6-kbps modem (a USR Sportster Faxmodem 33.6) took 4 minutes and 40 seconds to download the same files. That's a big savings in time—and in phone charges too, if you're on an hourly billing plan.

Per megabyte, the bigger and less compressible the file, the faster the download. The 56k units were 46 percent faster at transferring our 839K .tif file and 916K .zip file. The 611K .doc file, which is more compressible, showed the smallest gain—about 29 percent.

None of these numbers should be taken as the last word in 56-kbps performance. The tests were run over live phone lines, which are usually slower, and the results are not repeatable as in closed testing.

We tested the 33.6-kbps and the x2-based modems by dialing in to a server at U.S. Robotics headquarters in Skokie, Illinois. For the K56flex-based modems, we called Epoch, an ISP in Irvine, California.

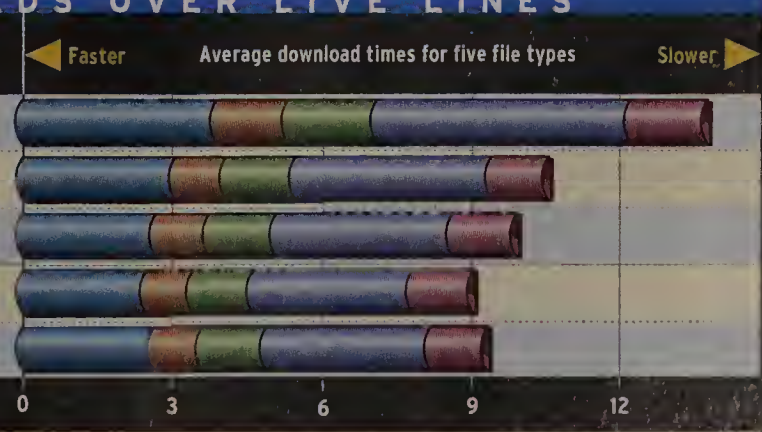
Keep in mind that we made long-distance calls for these 56-kbps tests; you may see better performance when you use a local number.

—*Eric Hellweg*

> Over live lines, the 56-kbps modems were about 43 percent faster than a 33.6-kbps modem downloading our test files.

56K TEARS THROUGH DOWNLOADS OVER LIVE LINES

MODEM	56-kbps protocol supported	Effective transfer rate (kbps)[1]	Transfer time per MB (min:sec)
U.S. Robotics Sportster Faxmodem 33.6	n/a	36.6	4:40
MaxTech NetPacer Pro 56k	x2	47.8	3:34
U.S. Robotics Sportster Faxmodem 56K	x2	51.1	3:21
U.S. Robotics Courier V.Everything 56k	x2	55.9	3:03
Diamond SupraExpress 56k	K56flex	54.1	3:09



839K .tif · 257K .jpg · 451K .exe · 916K .zip · 611K .doc

[1] With compression. n/a = not applicable

HOW WE TEST We ran our tests six times on a Gateway 2000 Pentium MMX-200 PC with a Hayes ESP serial card set to a 230-kbps data rate. We dialed in to the Internet on a PPP connection and used Procomm Plus's FTP client to transfer files. Final results are an average of the six runs.

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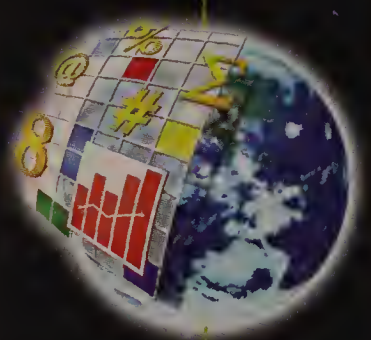

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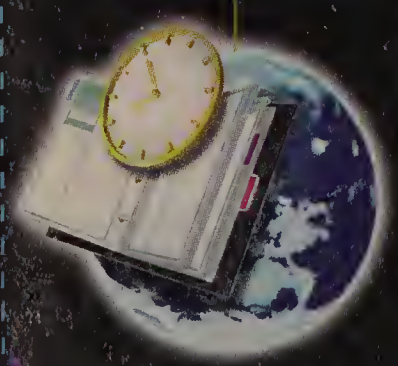

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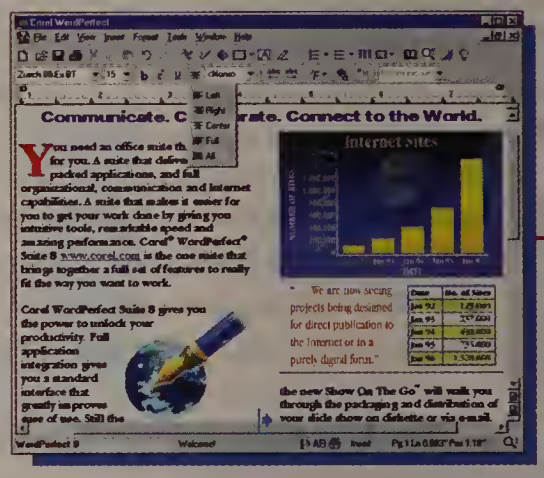

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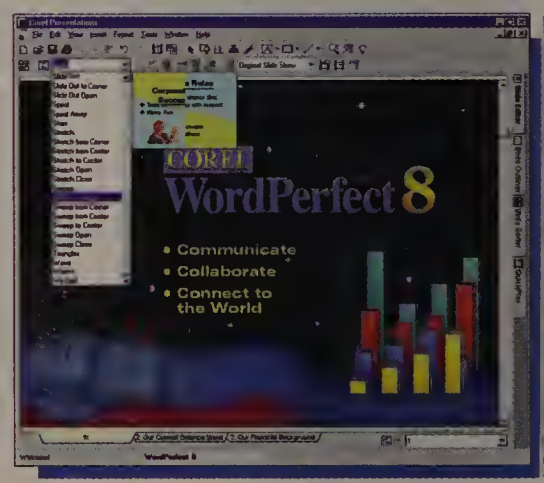

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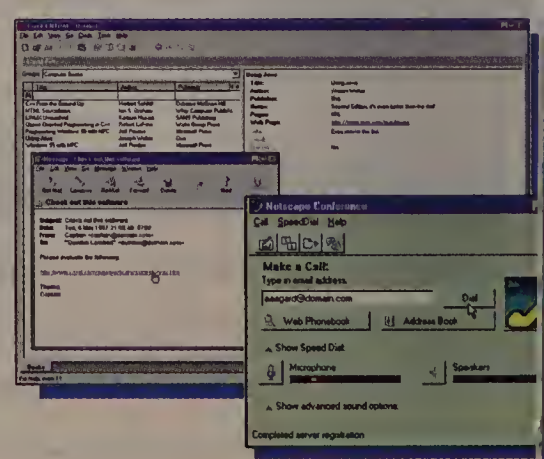

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Circle 78 on reader service card

1 U.S. Robotics Courier V.Everything

PRO: Excellent documentation, toll-free tech support

CON: Expensive

USR'S COURIER V.EVERYTHING has something for everyone. Everyone, that is, who's not put off by its $215 price—the second highest on our Top 10 Modems chart. It earns a Best Buy because it's easy to install, has great documentation, and with FlashROM is a cinch to upgrade.

The Courier V.Everything allows for easy COM port changes with these DIP switches, easily accessible from the outside of your computer.

The Courier comes with most of the features a small business would look for. You get distinctive ring and Caller ID (both of which must be supported by your phone company), password protection, and automatic reconnect—a convenient feature if you step away from your desk and the connection dies. Missing are the voice-mail options that a small business or home office user might want.

The software bundled with our Courier is also better than most: QuickLink II, a very nice fax and data software package; and Stampede's Remote Office Gold, a remote control application for telecommuters. USR's modem is the only one on our chart that doesn't use a Rockwell chip set, instead going it alone with chips from Texas Instruments. The V.Everything is one of only three modems with FlashROM.

The Courier's Plug and Play installation was quick and easy. If you're using Windows 3.*x* or another non–Plug and Play operating system, the modem has a dandy feature—its DIP switches are placed on the board's mounting bracket, so you can change the setting from outside the computer.

In our line quality test, using the TAS phone line simulator, the Courier was about 15 percent slower than the Hayes Optima, the fastest modem on the chart. The results of our file type test were a mixed bag: The Courier was the second slowest shipping our word processing file across the lines, but was very fast moving our tough-to-compress .zip file.

Modems are notorious for their bad documentation, but the Courier V.Everything comes with some of the most thorough and accessible documentation we've seen for beginners and corporate support staff alike. USR offers a five-year warranty (about average for modem vendors) and tech support 10 hours per weekday (also about average). Not typical is USR's toll-free telephone support; only it and Wisecom offer this. *U.S. Robotics, 800/342-5877, www.usr.com*

READER SERVICE NO. 613

2 Zoom FaxModem V.341 Plus

PRO: Fast, seven-year warranty, very inexpensive

CON: No security features such as Caller ID or password protection

ZOOM'S $89 V.341 PLUS is a bit short on features compared to the USR Courier, but it costs less than half as much and is faster—in fact, it ties with the Shark as the second fastest modem here. Add easy installation and a nice collection of software, and this is a fine general-purpose unit suitable for anyone who doesn't need a lot of bells and whistles and the price tag that comes with them.

What's missing? The Zoom lacks high-end features such as

INTERNAL MODEMS SCORECARD

	MODELS	Street price (3/15/97)	Ease of installation	Performance	Documentation	Software bundle
1	U.S. Robotics Courier V.Everything*	$215	outstanding	average	outstanding	outstanding
2	Zoom FaxModem V.341 Plus*	$89	outstanding	above average	outstanding	good
3	Hayes Optima 336B Internal Business Modem	$249	outstanding	above average	satisfactory	good
4	Diamond Multimedia SupraExpress 336i Sp with ASVD	$130	outstanding	average	good	very good
5	Shark Multimedia Baby Tiger 336R	$95	outstanding	above average	satisfactory	very good
6	Wisecom Accelerator IV 33600 Voice Internal	$99	poor	above average	satisfactory	good
7	Practical Peripherals Practical Internet Kit	$99	satisfactory	below average	poor	outstanding
8	Hayes Accura 336 Total Gaming Solution	$179	outstanding	below average	satisfactory	outstanding
9	Boca Research 33.6 Game/Business Modem	$120	poor	below average	good	outstanding
10	Practical Peripherals Practical 336 Voice/Data/Fax	$119	good	below average	satisfactory	outstanding

*Best Buy [1] Digital or analog simultaneous voice and data. [2] Saturdays only. See Top 10 chart, page 257.

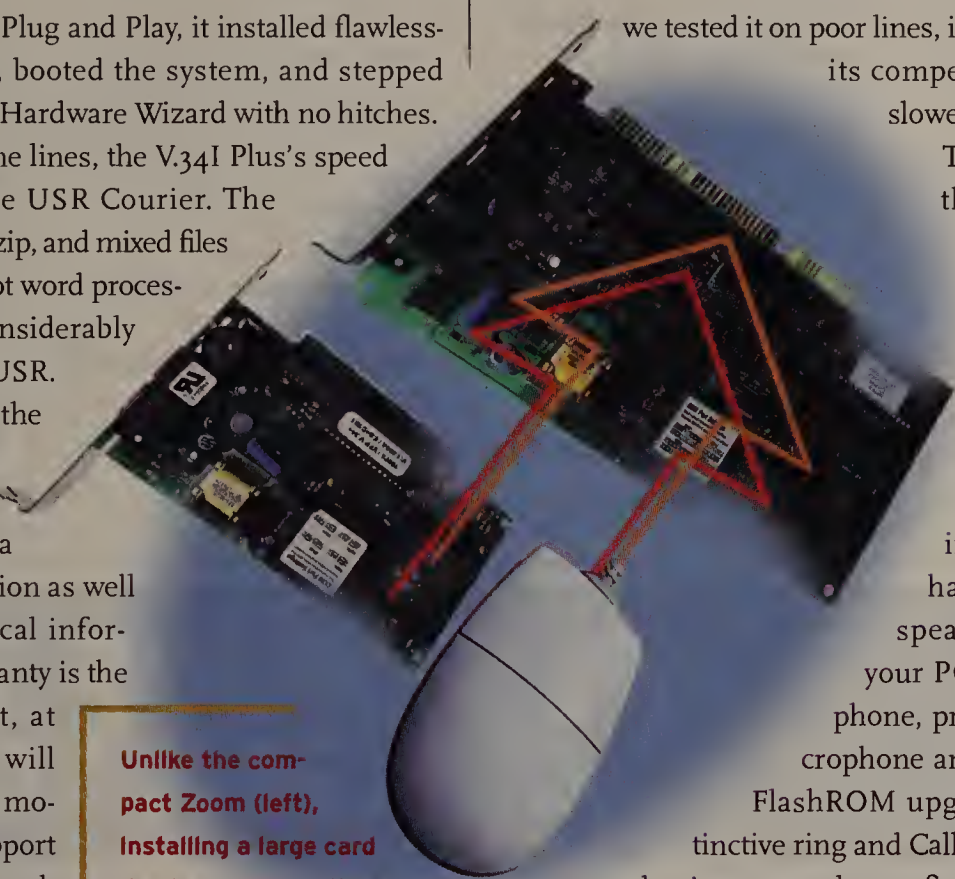
FlashROM and security functions like password protection and Caller ID. Nor does it have any of the handy SOHO features such as voice mail and speakerphone. It does, however, support distinctive ring and comes with Delrina's WinFax Lite and Comit—good packages if you send a lot of faxes from your modem. (Unfortunately, the WinFax manual we received was an abridged version, and the Comit program had no printed documentation at all.)

Though the modem is not Plug and Play, it installed flawlessly. We inserted the modem, booted the system, and stepped through Windows' Add New Hardware Wizard with no hitches.

Tested over a range of phone lines, the V.34I Plus's speed was very close to that of the USR Courier. The Zoom also handled graphics, .zip, and mixed files like the Courier did. But it shot word processing and .exe files across considerably faster than the number one USR.

The manual doesn't cover the installation instructions very thoroughly, but it does cover the basics, and there's a lengthy troubleshooting section as well as a comprehensive technical information section. Zoom's warranty is the third longest on our chart, at seven years. The company will also cross-ship replace your modem and offers technical support 14.5 hours a day during the week and 8 hours on Saturdays—extensive compared to other companies' policies. The only downside is that the phone call is not toll-free. *Zoom, 800/631-3116, www.zoomtel.com*

READER SERVICE NO. 614



Unlike the compact Zoom (left), installing a large card like the Hayes Optima (right) could be a problem.

3 Hayes Optima 336B Internal Business Modem

PRO: Fastest modem on chart, supports voice mail

CON: Most expensive on chart, large

THE OPTIMA 336B appears at number three despite the fact that at $249, it costs almost three times as much as the Zoom FaxModem V.34I Plus, the least expensive product on our chart. Simply put, the Optima is the fastest modem we looked at. It smoked on clean phone lines, and when we tested it on poor lines, it was less likely than most of its competitors to throttle back to a slower speed.

The Optima, Hayes's top-of-the-line analog modem, is aimed at the business market. It doesn't include any games, but comes with Hayes's own SmartCom Message Center LE data/fax/voice software, a good package. The metal mounting bracket of the ISA card has both microphone and speaker jacks, so you can use your PC as a telephone—or a Net phone, providing you supply the microphone and speakers. The Optima is FlashROM upgradable, and supports distinctive ring and Caller ID. It also allows the modem's setup to be configured remotely—that is, via another modem. It's a cool feature if you need to change some modem settings while on the road, like a password, for example.

The Plug and Play installation was flawless. The only potential installation problem is the card's size: At 8.5 inches long, it could get in the way of cables or other ISA cards in your PC. ▶

FEATURES									SUPPORT		
Fax/data software	Plug and Play	ISA card type/length (inches)	Chip set	VoiceView/ SVD[1]	FlashROM upgrade	Voice mail/ full-duplex speakerphone	Caller ID	Distinctive ring	Warranty (years)	Weekday support (hours)	Toll-free/ weekend support
QuickLink II	●	8-bit/6	TI	○/○	●	○/○	●	●	5	10	●/○
Comit, WinFax Lite	○	8-bit/5	Rockwell	○/○	○	○/○	○	●	7	14.5	○/●[2]
SmartCom Message Center LE	●	16-bit/8.5	Rockwell	○/○	●	●/○	●	●	5	10	○/○
Comit, FaxTalk	●	16-bit/6	Rockwell	○/●	●	●/●	●	●	5	14	○/●[2]
FaxWorks Voice	○	16-bit/8	Rockwell	○/●	○	●/●	●	●	3	10	○/○
SuperVoice	●	16-bit/6	Rockwell	●/●	○	●/●	●	●	5	8	●/○
QuickLink II	○	16-bit/6	Rockwell	○/○	○	○/○	○	○	lifetime	10	○/●
SmartCom Message Center LE	●	16-bit/8	Rockwell	●/●	○	●/●	●	●	5	10	○/○
QuickLink Message Center	●	16-bit/6	Rockwell	○/●	○	●/●	●	○	5	10.5	○/○
Practica Message Center LE	●	16-bit/6	Rockwell	○/○	○	●/●	●	●	lifetime	10	○/●

● Yes ○ No

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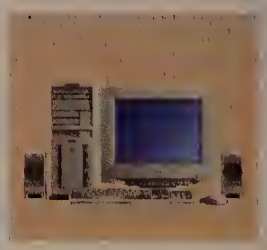

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★ *Leather Carrying Case, add $129.*

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The Optima has a terrific printed installation guide but little documentation other than that. Its documentation for technical users is available only on disc, not in printed form, which some people might view as a drawback. Phone support policies are barely adequate at 10 hours per weekday and none on weekends, but the company will cross-ship replace your modem. *Hayes, 770/840-9200, www.hayes.com*

READER SERVICE NO. 615

Diamond Multimedia SupraExpress 336i Sp with ASVD

4

PRO: Great support policies, excellent getting-started manual

CON: Slightly expensive

THE SUPRAEXPRESS 336I SP WITH ASVD is one of many good general-purpose modems. It costs $130 (average on the chart, but slightly expensive overall), and has a nice list of features and great support.

Extras include most of what a small business or a SOHO user could use: FlashROM for easy upgrades, a speakerphone that operates in full-duplex mode, simultaneous voice and data, distinctive ring, and Caller ID. On the other hand, the software bundle could be a little more robust—you get just FaxTalk and Comit and no extras. The former is a very good program, but it isn't quite as intuitive as QuickLink II.

Installation was uneventful—it worked just as Plug and Play should. The documentation gave us clear instructions on how to install the modem in new and not-so-new computers and with different operating systems. There was no glossary or index, however. Diamond offers great support policies, with support lines open 14 hours on weekdays and 8 hours on Saturdays. Cross-ship replacement of defective modems and a 30-day money-back guarantee round out the package. Our only complaint is that the support lines aren't toll-free. *Diamond Multimedia, 800/727-8772, www.diamondmm.com*

Diamond offers great support policies, with support lines open 14 hours on weekdays and 8 hours on Saturdays.

READER SERVICE NO. 616

Shark Multimedia Baby Tiger 336R

5

PRO: Fast, inexpensive, excellent installation guide

CON: Paltry support offerings, skimpy documentation

JUDGING BY its rather unusual name, we weren't sure if this was a modem or some hot new toy. Once we played with it a bit, however, Shark Multimedia's Baby Tiger turned out to be a pretty good modem. Like the Zoom, the Baby Tiger is fast and cheap—only $95. But unlike the 5-inch Zoom, the Baby Tiger is no baby; it's a full-size 8-inch-long board. It has a fine collection of features, but in-depth documentation is not how this Tiger earned its stripes.

This is the first modem we've seen from Shark Multimedia, a 2-year-old company, and we must admit that it's made a great first impression. The Baby Tiger came with a copy of Global ▶

TEST REPORT

Hayes Optima, Shark, Zoom Move Files Fastest

Wisecom also makes impressive debut in a crowded 33.6-kbps field.

	INTERNAL MODEMS	Effective transfer rate (kbps)[1]	Transfer time per MB (min:sec)
1	U.S. Robotics Courier V.Everything*	62.4	2:44
2	Zoom FaxModem V.34I Plus*	64.8	2:38
3	Hayes Optima 336B Internal Business Modem	67.8	2:31
4	Diamond Multimedia SupraExpress 336i Sp with ASVD	62.1	2:45
5	Shark Multimedia Baby Tiger 336R	64.8	2:38
6	Wisecom Accelerator IV 33600 Voice Internal	63.2	2:42
7	Practical Peripherals Practical Internet Kit	61	2:48
8	Hayes Accura 336 Total Gaming Solution	60.6	2:49
9	Boca Research 33.6 Game/Business Modem	60.6	2:49
10	Practical Peripherals Practical 336 Voice/Data/Fax	56.9	3:00

*Best Buy

phone line test file type test [1]With compression.

HOW WE TEST We install an identical pair of modems in two Gateway Pentium MMX-200s, each containing 32MB of SDRAM. We connect the modems through a TAS simulated public phone network that uses Hayes 230-kbps ESP serial cards. We measure the modems' transfer rate using the phone line test and the file type test, as outlined in EIA/TIA TSB 37 and 38b. For the phone line test, we send a 328K text file over 55 different line conditions, which represent 95 percent of the line conditions found in the U.S. For the file type test, we send a 983K .gif file, a 328K .doc file, a 197K .exe file, a 131K .zip file, and a 524K mix of these four file types over the same line condition eight times. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

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Circle 150 on reader service card

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RUFF, WOOF, ERRRR, WOOF, WOOF...

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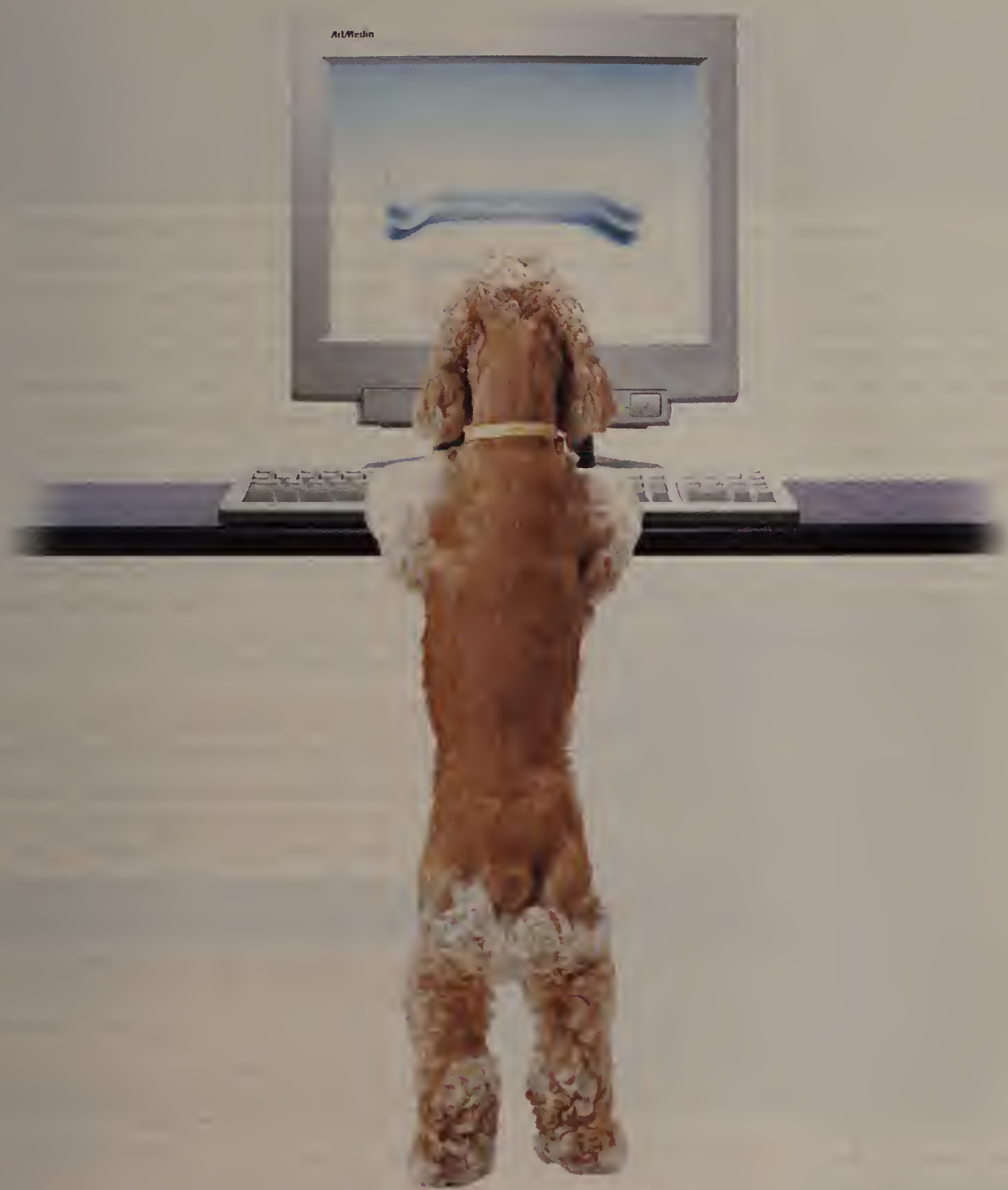

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Village's FaxWorks Voice, one of the better communications programs around. And in case you want to use the Baby Tiger to turn your PC into a full-duplex speakerphone or voice-mail system, the package includes a microphone (but you'll need to supply the speakers), DSVD, distinctive ring, and Caller ID.

The Baby Tiger's overall performance was terrific. It tied with the Zoom for second place in overall speed. Although the modem is not Plug and Play, installation was a breeze. Just be sure you read the quick-start guide, the only documentation the modem comes with. The catch—which you'll miss if you don't read this guide—is that with Windows 95, you have to install the modem as a Win95 Multi-Function Adapter and not as a Modem in the Add New Hardware Wizard. If you miss this step, the modem won't run. The guide describes the process precisely and even has color photographs for computer neophytes.

Shark skimps on the telephone technical support—it's a toll call, and the lines are open only 10 hours per day during the week. The warranty is a short three years. *Shark Multimedia, 800/800-3321, www.sharkmm.com*

READER SERVICE NO. 617

Wisecom Accelerator IV 33600 Voice Internal

6

PRO: Above-average performer, inexpensive, toll-free tech support

CON: Brief documentation resulted in nightmarish installation

ARE YOU THE KIND OF PERSON who tends to fly off the handle when things don't go as planned? If so, we recommend you avoid this modem. The minimal documentation provides little guidance—for example, it neglects to mention that you can't complete the installation process without a Windows 95 CD-ROM in hand, which is sometimes necessary when a modem has VoiceView.

Obviously, the Accelerator IV didn't make a great first impression, but once we got past the installation, we discovered this modem is a lot like the Zoom: It runs near the head of the pack on file transfers, copes well with all kinds of telephone lines, and, at $99, costs less than most of the competition. If you're running a small or home office, the Wisecom has two items the Zoom lacks that could be worth the extra $10: voice mail and a full-duplex speakerphone. The modem's only software is a communications package called SuperVoice, which comes with no documentation. If you can figure it out on your own, it's a good program, if rudimentary.

Support is a mixed bag. Wisecom offers toll-free tech support, but the lines are open only 8 hours each weekday. And Wisecom doesn't provide cross-ship replacement if your modem stops working. *Wisecom, 888/947-3266, www.wisecominc.com*

READER SERVICE NO. 618

The Wisecom has two features that the Zoom lacks: voice mail and a full-duplex speakerphone.

Practical Peripherals Practical Internet Kit

7

PRO: Great support policies, nice software bundle

CON: Generic, confusing manual made for a somewhat tricky installation; no security features

IT'S NOT HARD TO FIGURE OUT what this modem is designed for. Practical Peripherals packed a lot into its Practical Internet Kit and managed to keep the price down to only $99. You get an extraordinary software bundle that includes QuickLink II, McAfee's VirusScan, and Quarterdeck's Webtalk, though to use the last, your computer will need its own sound card, microphone, and speakers.

That said, the Practical Internet Kit is slow, pushing all file types below the average speed on clean phone lines. On medium and poor phone lines, it was one of the slowest of the 14 modems we tested this month. ▶

I Want My 56K!

NO 56-KBPS INTERNAL MODEMS were available in time for the Top 10, but they will be by the time you read this. Until then, vendors are promising upgrades to consumers who buy their 33.6-kbps modems beforehand. Your options: the U.S. Robotics technology, dubbed x2, and the Rockwell/Lucent offering, called K56flex. Practical Peripherals is the only vendor that lets you choose between the two.

	MODEM	Protocol supported	Upgrade method	Price [1]	Upgrade comments
1	U.S. Robotics Courier V.Everything*	x2	FlashROM	$60	Free if 33.6-kbps USR modem was registered for upgrade before 2/28/97.
2	Zoom FaxModem V.34I Plus*	K56flex	trade-in	$59	No upgrades on modems purchased after 3/31/97.
3	Hayes Optima 336B Internal Business Modem	K56flex	trade-in	$89	Through 6/30/97, free upgrade if 33.6 modem was purchased between 2/1/97 and 4/15/97.
4	Diamond Multimedia Supra-Express 336i Sp with ASVD	K56flex	trade-in	$150	Diamond still working out the details; no upgrades after 6/30/97.
5	Shark Multimedia Baby Tiger 336R	K56flex	trade-in	$40	No time restrictions on trade-in.
6	Wisecom Accelerator IV 33600 Voice Internal	K56flex	trade-in	$49	Through 10/31/97.
7	Practical Peripherals Practical Internet Kit	K56flex or x2	trade-in	$89	Through 6/30/97.
8	Hayes Accura 336 Total Gaming Solution	K56flex	trade-in	$89	Through 6/30/97, free upgrade if 33.6 modem was purchased between 2/1/97 and 4/15/97.
9	Boca Research 33.6 Game/Business Modem	K56flex	trade-in	$99	No time restrictions.
10	Practical Peripherals Practical 336 Voice/Data/Fax	K56flex or x2	trade-in	$89	Through 6/30/97.

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[1] Shipping charges extra.

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Practical cut corners on documentation and security. The modem offers no password protection, no FlashROM upgradability, and no Caller ID. The installation guide is the only documentation—there's no technical manual. The installation guide covers all Practical modems, so some illustrations, including the jumper layout on this non–Plug and Play modem, don't match the modem itself. Luckily, there was a sticker on the modem that showed the proper layout.

Considering how difficult the documentation was to understand and decipher, it's a good thing Practical Peripherals has decent support hours—9 hours on both Saturday and Sunday, as well as 10 hours a day during the week—and cross-ship replacement. Practical Peripherals is the only vendor on our chart to offer a lifetime warranty. *Practical Peripherals, 770/441-0896, www.practinet.com*

READER SERVICE NO. 619

8 Hayes Accura 336 Total Gaming Solution

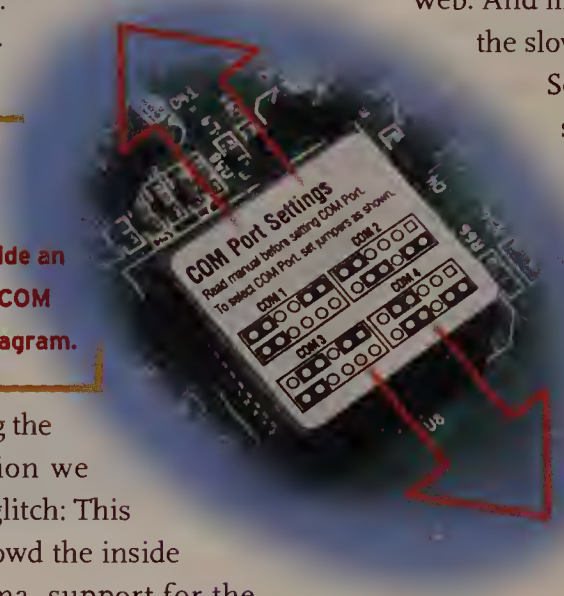
PRO: Great software bundle, flawless installation

CON: Mediocre documentation, expensive, below-average speed

HAYES CLEARLY INTENDED this modem to be a sort of oversized stocking stuffer, though given its $179 price, you'd have to be pretty darn good to get this in your stocking. The Total Gaming Solution comes packed with a microphone, headphones, a full-duplex speakerphone with ASVD capability, and two CD-ROMs of games and applications—in short, enough stimulation to keep a bored teenager quiet until the ISDN installer shows up.

The Accura won't win any price/performance prizes. On clean telephone lines it transferred files slightly below average; on mediocre and poor lines it dropped well below the pack. It came with a generic Hayes installation guide that's thorough enough, especially considering the trouble-free Plug and Play installation we encountered. One possible installation glitch: This modem is 8 inches long and might crowd the inside of your PC. As with the Hayes Optima, support for the Accura is fairly basic. *Hayes, 770/840-9200, www.hayes.com*

READER SERVICE NO. 620



The Practical Peripherals modems provide an easy-to-read COM port layout diagram.

9 Boca Research 33.6 Game/Business Modem

PRO: Great software bundle

CON: Below-average performer, tricky installation

THIS COMBINATION game/business modem includes ten games, some of which are multiuser, and several business software applications. For example, you and a colleague at another computer could both launch FarSite Lite to look at, alter, and discuss a document that appears on both of your screens, thanks to the modem's DSVD capability. Or you could compete against friends in a game of WarCraft or Terminal Velocity, keeping up a steady banter to distract them as you zoom in for the kill. At $120, this is not a compelling package unless you really want the software bundle and don't mind less-than-blazing performance.

The Boca is among the pokiest modems we tested. Its performance was roughly equal to that of the Hayes Accura and the Practical Internet Kit. In other words, it was below average. Boca bundles the great QuickLink Message Center and backs the unit with a solid five-year warranty, but the company doesn't beef up the package with any extras such as cross-ship replacement. The installation wasn't by-the-books Plug and Play, either. The CD-ROM with the modem drivers wasn't labeled clearly. After we figured out which was the correct disc, we were told to put in the Windows 95 disc. After this step, the modem installed okay. *Boca Research, 561/997-7202, www.bocaresearch.com*

READER SERVICE NO. 621

> The Total Gaming Solution comes with enough stimulation to keep a bored teenager quiet until ISDN arrives.

10 Practical Peripherals Practical 336 Voice/Data/Fax

PRO: Excellent support policies, preconfigured voice-mail menu and message system, full-duplex speakerphone

CON: Slowest modem on chart by a wide margin

PRACTICAL PERIPHERALS designed the Practical 336 Voice/Data/Fax to fill the business niche in the same way that the Practical Internet Kit is designed for the Web. And like the Internet Kit, the 336 is slow—in fact, it's the slowest modem in the Top 10.

So what put this $119 modem on the chart? Its software bundle and well-rounded list of features, such as distinctive ring, Caller ID, and full-duplex speakerphone.

The modem comes loaded with software—the same bundle provided with the Internet Kit plus Practica Message Center LE, a decent fax/data/voice package that supports voice mail. A microphone is also included. And though the modem isn't exactly overflowing with documentation, it does provide a decent installation manual, with easy-to-follow illustrations and descriptions.

Practical Peripherals' support policies are among the best on the chart, with a lifetime warranty, cross-ship replacement, and weekend tech support. Unfortunately, the call is on your dime. *Practical Peripherals, 770/441-0896, www.practinet.com*

READER SERVICE NO. 622

Eric Hellweg is a staff editor for PC World. *Dan Littman is a frequent contributor and has been reviewing computer hardware and software for more than ten years. Testing by Elliot Kirschling and Susan Silvius of the PC World Test Center.*

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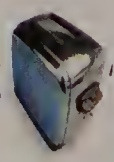
YOU'VE BEEN TO THE  "MEGA STORES."

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- 12.1" SVGA Dual Scan Color Display
- 166MHz Pentium Processor
- 16MB RAM, 256K L2 Cache
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- 10X CD-ROM Drive (Removable)
- Infrared Interface Support
- 16-Bit Built-in Sound with Speakers
- Integrated Personal Touchpad
- Two Type II / One Type III PCMCIA Slot
- Lithium Battery / AC Adapter
- Microsoft Windows95
- Quicken Deluxe
- Lotus SmartSuite or Corel Office Professional 7
- Two-Year Warranty, 30-Day Money-Back Guarantee
- Carrying Case

$1995

BUSINESS LEASE **$66/mo.**

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- Infrared Interface Support
- 16-Bit Built-in Sound with Speakers
- Integrated Personal Touchpad
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- Mobile Car Adapter
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- Quicken Deluxe
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- Carrying Case

$2495

BUSINESS LEASE **$82/mo.**

Apex™ M-166

- 12.1" SVGA Active Matrix Color Display
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- 32MB EDO RAM, 256K L2 Cache
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- 2.1GB Hard Drive / 3.5" Floppy
- 10X CD-ROM Drive (Removable)
- Zoomed Video Port, Video In Jack
- Infrared Interface Support
- 16-Bit Built-in Sound with Speakers
- Integrated Personal Touchpad
- Two Type II / One Type III PCMCIA Slot
- Lithium Battery / AC Adapter
- 33.6 PCMCIA Fax Modem
- Mobile Car Adapter
- Microsoft Windows95
- Quicken Deluxe
- Microsoft Office 97 Small Business Edition
- Lotus Organizer
- Two-Year Warranty, 30-Day Money-Back Guarantee
- Ballistic Nylon Carrying Case

$3095

BUSINESS LEASE **$102/mo.**

Apex™ M-200

- 13.3" SVGA Active Matrix Color Display
- 200MHz Pentium Processor **WITH MMX TECHNOLOGY**
- 48MB EDO RAM, 256K Pipeline
- 2MB EDO PCI Graphics
- 2.1GB Hard Drive / 3.5" Floppy
- 16X CD-ROM Drive (Removable)
- Zoomed Video Port, Video In Jack
- Infrared Interface Support
- 16-Bit Built-in Sound with Speakers
- Integrated Personal Touchpad
- Two Type II / One Type III PCMCIA Slot
- Lithium Battery and AC Adapter
- 33.6 PCMCIA Fax Modem
- Mobile Car Adapter
- Microsoft Windows95
- Quicken Deluxe
- Microsoft Office 97 Small Business Edition
- Lotus Organizer
- Two-Year Warranty 30-Day Money-Back Guarantee
- Ballistic Nylon Carrying Case

$3895

BUSINESS LEASE **$128/mo.**

DESKTOP TECHNOLOGY

Evolution™ SC-166

- 166MHz Pentium Processor
- 16MB EDO RAM, 256K Pipeline Burst Cache
- 2.1GB EIDE Hard Drive
- 2MB PCI 64-Bit Video
- 17" Non-Interlaced (.28 Dot Pitch) MPR II Compliant, Low Radiation
- Ensonic PCI Concert Busmastering Wavetable Sound Card with Labtec Speakers
- 16X EIDE CD-ROM/1.44MB Floppy
- Internal 33.6 Fax Modem with Voice Mail, Full Duplex Speaker Phone and Caller ID
- 104 Enhanced Keyboard, Microsoft Mouse with Pad
- Microsoft Windows95
- Quicken Deluxe
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- Three-Year Warranty, 30-Day Money-Back Guarantee, and One-Year On-Site Service

$1545

BUSINESS LEASE **$51/mo.**

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- 166MHz Pentium Processor **WITH MMX TECHNOLOGY**
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- Ensonic PCI Concert Busmastering Wavetable Sound Card with Labtec Speakers
- 16X EIDE CD-ROM/1.44MB Floppy
- Internal 33.6 Fax Modem with Voice Mail, Full Duplex Speaker Phone and Caller ID
- 104 Enhanced Keyboard, Microsoft Mouse with Pad
- Microsoft Windows95
- Quicken Deluxe
- Lotus SmartSuite or Corel Office Professional 7
- Three-Year Warranty, 30-Day Money-Back Guarantee, and One-Year On-Site Service

$1845

BUSINESS LEASE **$61/mo.**

Evolution™ M-200

- 200MHz Pentium Processor **WITH MMX TECHNOLOGY**
- 32MB EDO RAM, 512K Pipeline Burst Cache
- 4.3GB EIDE Hard Drive
- Diamond Stealth 3D 4MB EDO PCI 64-Bit Video
- 17" N.I. 1600 x 1200 (.25 Dot Pitch) MPR II Compliant, Low Radiation
- Ensonic PCI Concert Busmastering Wavetable Sound Card with Labtec 2612 3-D Satelites and Subwoofer
- Labtec N-DAT Microphone
- 16X EIDE CD-ROM/1.44MB Floppy
- Internal 33.6 Fax Modem with Voice Mail, Full Duplex Speaker Phone and Caller ID
- 104 Enhanced Keyboard, Microsoft Mouse with Pad
- Microsoft Windows95
- Quicken Deluxe
- Microsoft Office 97 Small Business Edition
- Three-Year Warranty, 30-Day Money-Back Guarantee, and One-Year On-Site Service

$2245

BUSINESS LEASE **$74/mo.**

Evolution™ LPII-266

- 266MHz Pentium II Processor
- 64MB EDO RAM, 512K Cache
- 6.5GB EIDE Hard Drive
- Diamond Stealth 2MB VRAM PCI 64-Bit Video (upgradeable to 4MB VRAM)
- 17" Non-Interlaced (.28 Dot Pitch) MPR II Compliant, Low Radiation
- Ensonic PCI Concert Busmastering Wavetable Sound Card with Labtec 2612 3-D Satelites and Subwoofer
- Labtec N-DAT Microphone
- 16X EIDE CD-ROM/1.44MB Floppy
- Internal 56K Fax Modem with Voice Mail, Full Duplex Speaker Phone and Caller ID
- 104 Enhanced Keyboard, Microsoft Mouse with Pad
- Microsoft Windows95
- Microsoft Office 97 Small Business Edition
- Three-Year Warranty, 30-Day Money-Back Guarantee, and One-Year On-Site Service

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SMALL Office Home OFFICE

FROM HIGH-RISE TO HOME: HOW TO SET UP A SMALL OFFICE THAT WORKS.

INSIDE

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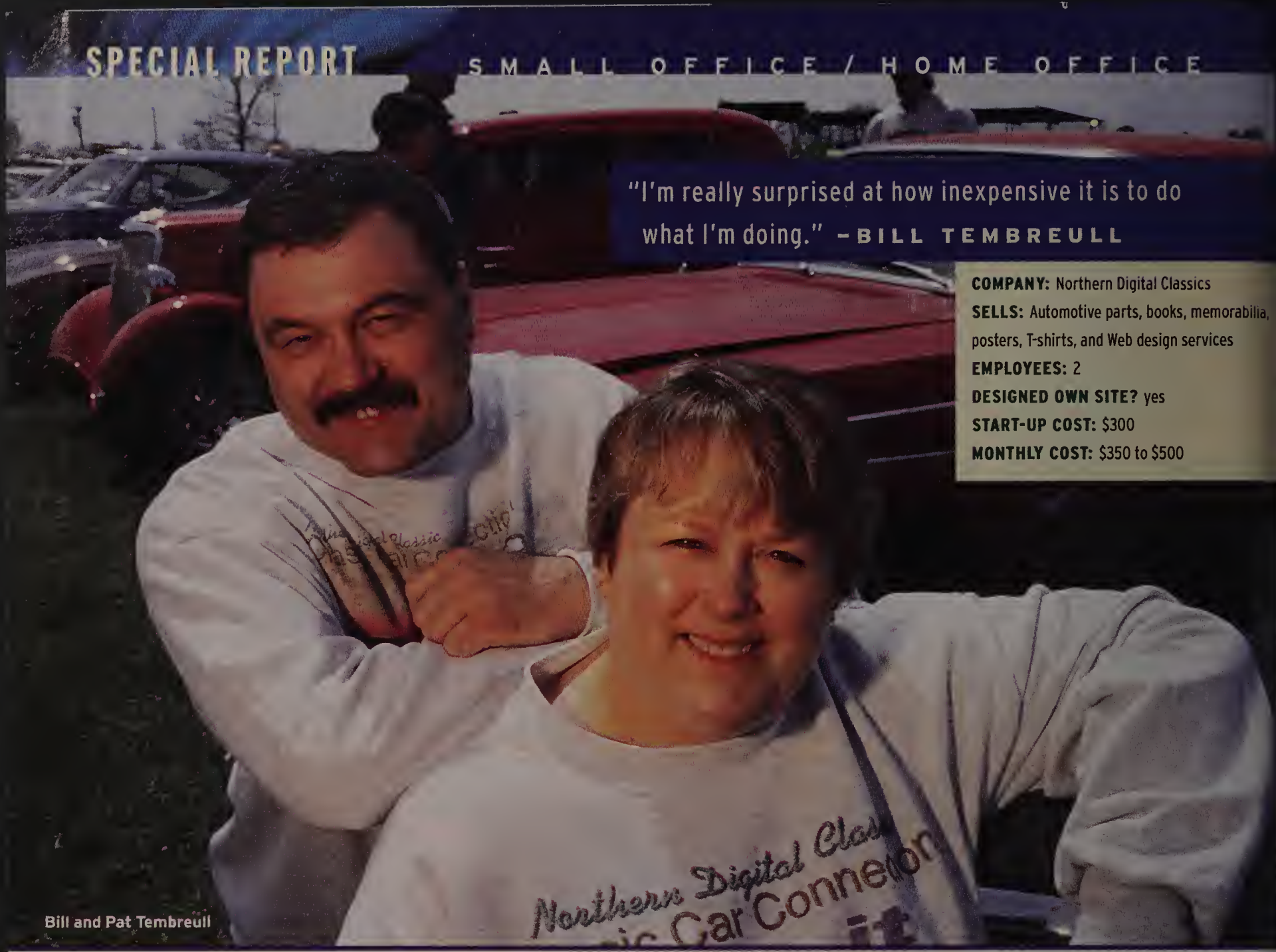
Owners of four small businesses tell us how they're doing it.

199 Hot Picks for the Home Office
Cheap multifunction device, free e-mail, and more.

EDITED BY
ANGELA FREEMAN



"I'm really surprised at how inexpensive it is to do what I'm doing." – BILL TEMBREULL

COMPANY: Northern Digital Classics
SELLS: Automotive parts, books, memorabilia, posters, T-shirts, and Web design services
EMPLOYEES: 2
DESIGNED OWN SITE? yes
START-UP COST: $300
MONTHLY COST: $350 to $500

Bill and Pat Tembreull

You *Can* Make Money on the Web

Ever dreamed of making a million bucks on the Web? We talked to four small businesses to find out what it takes. By Mike Hogan

IN THE SUMMER of 1995, Jeff Bezos and his wife, MacKenzie, decided to risk it all on the Internet. They opened a cyberbookstore named Amazon.com.

Two years later, Amazon.com employs 300 people and boasts 2.5 million book titles in its catalog. It's one of the World Wide Web's most successful small businesses.

Few who have braved the wilds of Web business have achieved Amazon.com-style success. But small, nimble firms with new ideas have a unique opportunity, says Cowles/Simba Information analyst Karen Burka. "You don't need a lot of money to launch and sell a product or service online. A mom-and-pop shop...can now create an international business."

But it takes more than simply mastering the technology—that's the easy stuff, say experienced Web

PHOTOGRAPH: SCOTT WITTE

merchants. The challenges facing fledgling Web businesses are the same ones that plague any start-up—making the most of marketing and advertising dollars, maintaining top-rate customer service, and exploiting new ideas before someone else beats you to them.

The potential is awesome. By the year 2000, some 80 million people will be spending more than $4 billion a year on Net goods and services, predicts Burka. How do you get some of those cyberdollars flowing down your phone line? We interviewed several firms having different degrees of success on the Web, from mom-and-pops to empires in the making. Here's how they've done it, what it's cost them, and what they've learned along the way.

Mike Hogan is a freelance writer living in Carlsbad, California.

NORTHERN DIGITAL CLASSICS

Putting "Mom-and-Pop" Into Web Commerce

BILL AND PAT TEMBREULL have been traveling to classic car shows since Bill's high school days as a hot-rod mechanic. It wasn't until recently, though, that the Pelkie, Michigan, couple could make money from their hobby.

Now they've opened Northern Digital Classics (www.ndcnorth.com), their own one-stop shop for other car nuts. NDC is a place where people with grease under their nails can go to talk cars, buy cars, or sell cars and parts.

To support the effort, the Tembreulls are cyberdistributors for a variety of companies that make automotive parts, books, memorabilia, posters, and T-shirts. They also build and display Web pages for other local businesses for only $99 a year.

"In the classic Web way of doing things, you give away some things and you sell some things," says Bill, who is the manager of Michigan Technological University's publications, photo services, and print shop department by day.

The Tembreulls are designers, not programmers, so they leaned heavily on UP.net, their ISP, to help set up their proxy domain and script their pages; a Michigan Tech student did some page-linking programming.

It cost about $300 to get started. Monthly costs run $350 to $500, including $79 for the Web site, $20 for a toll-free phone number, and a percentage of sales paid to credit card companies.

The tough part is promoting their site. They had no trouble getting listed in search engines and linking to other car sites, but they haven't bought any ads yet.

Things are starting to pick up, says Pat, allowing the Tembreulls to clear a few hundred dollars a month after expenses. But they aren't in it just for the money.

"The unique thing about the Web is the friendliness of it," says Bill. "I make a sale for a company and a sale for myself, and I make a friend talking to someone who is doing the same thing I'm doing."

Five Tips to Get You Going

1 **Use the tools.** Don't copy a real-world business to the Web. Offer a unique service, and make use of the Net's graphic nature and interactivity to stay ahead of the competition.

2 **Spend money to make money.** Expect to lay out a significant percentage of operating costs on marketing—how much you'll need depends on the type of business you plan.

3 **Listen to your customers.** Customer satisfaction can make or break your business. Encourage feedback via e-mail, and make changes as needed.

4 **Farm out the grunge work.** You don't have to do everything yourself. Outsource site creation and maintenance, and concentrate on your business.

5 **Get going.** There are no barriers—financial, governmental, or otherwise—to starting a business on the Web. So what are you waiting for?

J&D RESOURCES

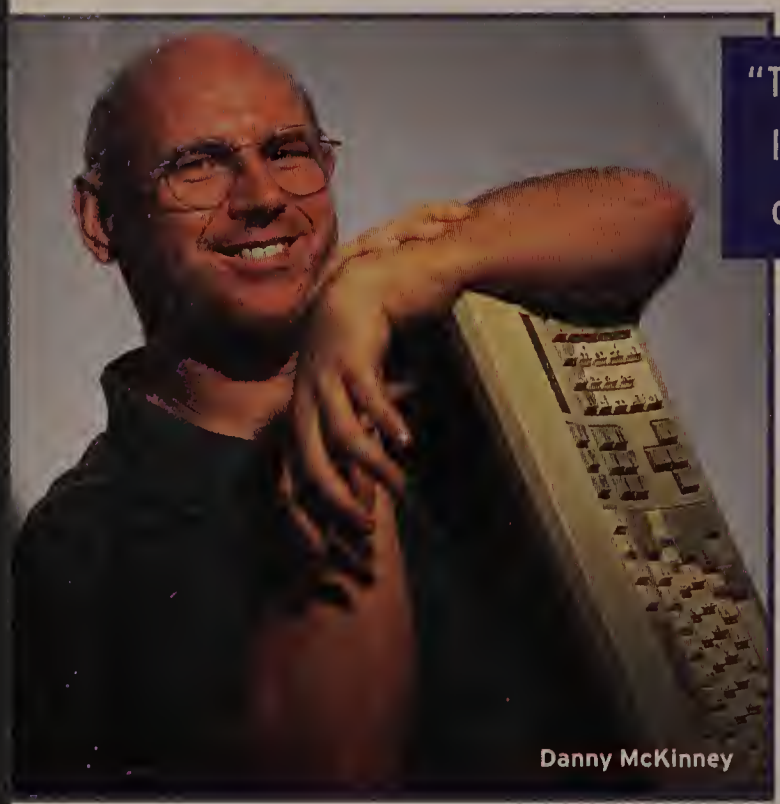
A Perfect Match

J&D RESOURCES found a way to make a buck in cyberspace earlier than most businesses. The six-member personnel placement agency has operated a Web site from its Memphis office for more than two years—in fast-forward Web time, that makes them pioneers.

J&D's secret weapon? Danny McKinney. A 15-year background in data processing helps McKinney make the high-tech matches that are J&D's recruitment specialty. It also makes him J&D's de facto IS manager, and the brains behind the company's Web site (www.jdresources.com).

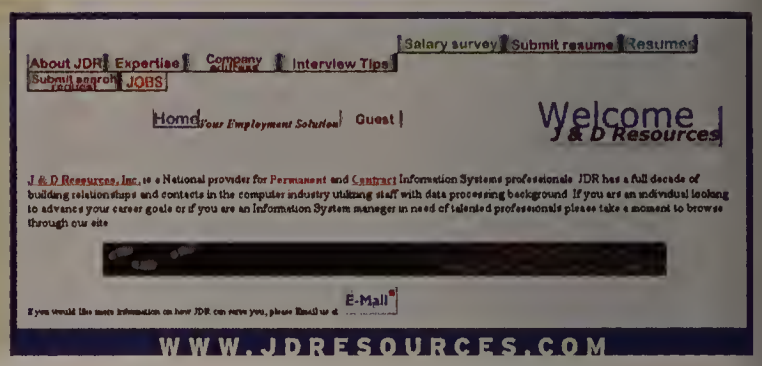
As vice president of a firm chasing $2 million in annual billings, you'd think he'd have better things to do. But McKinney says it takes only about 15 minutes a day to maintain the site.

He designed and manages the site with Microsoft FrontPage, using JPEG images and Word for Windows 95 documents ▶


Danny McKinney

"The greatest challenge is getting your site found. It doesn't do you any good to have a site if people can't find it." – DANNY MCKINNEY

COMPANY: J&D Resources
SELLS: Temporary employment and permanent placement personnel services
EMPLOYEES: 6
DESIGNED OWN SITE? yes
START-UP COST: $900
MONTHLY COST: $270



saved in HTML format. His Web links take visitors to summaries of new job openings and new applicant résumés. An applicant can fill in a profile on the site or attach a résumé to an e-mail message.

J&D Resources' ISP is Webnet Memphis, one of the few local providers that would let him update the site himself. That's critical because his company adds new jobs and applicant summaries a few times a day.

"Anyone could do this," McKinney insists. And almost anyone can afford to. It cost only $900 to set up, register, and include the site in 200 search engines. Monthly site costs break down to $50 for server space and $120 to put six PCs on an ISDN line. J&D also advertises on other career-related sites, paying around $100 a month.

"[The site] has probably increased our annual revenues by about 5 percent," says McKinney. "It more than pays for itself."

ALL ONE TRIBE

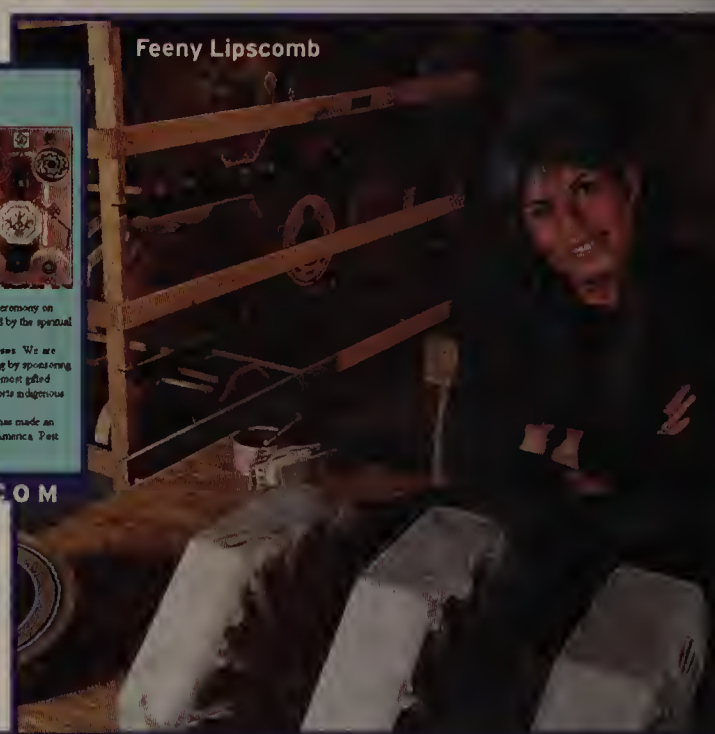
Drums Along the I-way

A LOT OF BUSINESSPEOPLE are said to have vision. But Feeny Lipscomb's All One Tribe mail-order business in Taos, New Mexico, is one enterprise that was actually prompted by a vision. A workout on her favorite drum gave Lipscomb the inspiration to tell the rest of the world about the physical and psychic benefits of regular drumming.

All One Tribe (www.allonetribedrum.com) is Lipscomb's online attempt to reach more folks than she can from Southwest Moccasin and Drum—a store in a tiny adobe that she, life and business partner Bruce Ross, and Charles Conley have operated since 1991. Capturing a specialty market in Taos is one thing; expand that niche to the Internet, and your customer base becomes global.

The drums that Lipscomb sells cost $125 to $225 each and are created by Native American drum makers in Taos and hand-printed with indigenous designs by artists B. J. Quintana and Carl Winters. Manufacturing all-natural products by hand has its problems—including high cost of materials. But like other small business owners who've ventured onto the Web, Lipscomb's biggest challenge has been marketing.

All One Tribe had been advertising with limited success in publications such as the *New Age Journal*. Then Ross arranged Web pages for both the retail and mail-order enterprises in the middle of 1995. Neither he nor Lipscomb know much about maintaining a Web site, so their page is run by SoulZone, which rents Web space to them for $50 a month. Mar- ▶


Feeny Lipscomb

COMPANY: All One Tribe
SELLS: One-of-a-kind drums, decorative drum hangers, handmade beaters, and custom drum bags from Taos artisans
EMPLOYEES: 2
DESIGNED OWN SITE? no
START-UP COST: $350
MONTHLY COST: $250

"The Web page has gotten the word out more broadly than we could ever have done with a print ad." – FEENY LIPSCOMB

PHOTOGRAPHS: (TOP) PATRICK MURPHY LACEY; (BOTTOM) CARY HERZ

NED

Ned knows he can book a flight

from a computer.

BOB

Bob knows from his computer he can book a flight (and earn up to 500 bonus AAdvantage® miles every time he does so), select his seat, see what movie is playing, manage his AAdvantage account, check out special AAdvantage promotions and low Net SAAver Fares™, look up all sorts of flight information and learn interesting facts most humans don't know about airplanes. For instance, did you know a Boeing 757 has a wingspan of 124′ 10″, roughly six times that of the average pterodactyl?

Bob did.

So what does Bob know that you and Ned don't, besides the wingspans of extinct creatures? He knows about AAccess™ – the American Airlines Interactive Travel Network™, available on the web and with Personal AAccess™ software.

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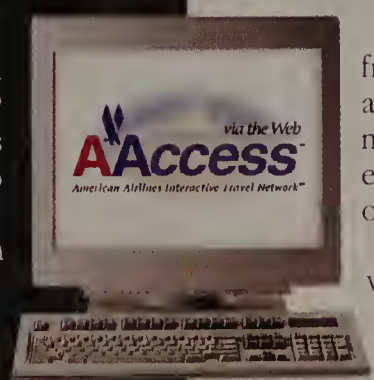

So why let Bob have all the fun? Visit AAccess via the Web™ on the Internet. Or for a WINDOWS®-based link to American Airlines, call for our Personal AAccess software.

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Online Resources

*Ready to seek your **fortune** in cyberspace? Better stop by some of these sites first. You'll find **lots of small-business resources** to help you on your way.*

- **Internet Assigned Numbers Authority** (www.isi.edu/div/iana/) Keeps a registry of IP addresses, domain names, and other protocols.
- **Network Solutions** (www. netsol.com) Registers your domain and IP address for two years for $100, plus $50 a year.
- **CompuServe's Home Page** (www .compuserve.com) Monthly rate includes free authoring tool, plus 5MB of space for your home page. 800/ 848-8990
- **business1.com** (business1.com) Features a search engine to find government resources, business suppliers, and related links.
- **America's Business Funding Directory** (www.businessfinance.com) An engine that searches on funding sources, with links to venture capitalists, government funding, banks, and investment clubs.
- **Nest Egg IRS Tax Information Center** (nestegg.iddis.com/nestegg/ articles/taxctr.html) Contains articles on small business taxes and IRS tax forms that can be downloaded in Acrobat format.
- **Entrepreneurial Edge Online** (www .edgeonline.com) Webzine filled with how-to articles and links for small businesses.

keting costs run about $200 a month.

So far, advertising on their Web page has brought in a few thousand dollars in sales from Australia, France, Germany, and other far-flung locales. But Lipscomb figures a lot more can be made here at home, pointing to a recent *Wall Street Journal* article about corporate America's use of drums to reduce stress and promote team building.

"We've never sold all the drums we could make, but we expect to increase demand using the Internet," Lipscomb says. "Because absolutely everyone can benefit from owning a drum."

RENT.NET

House Hunting in Cyberspace

SOMETIME AFTER his third weekend in San Francisco sleeping on friend Jed Katz's couch, Phil Marcus decided there had to be a better way to find an apartment. So in 1995 he and Katz created Rent.Net, an interactive Web source for finding a new place to hang your hat.

The company Web site (www.rent.net) lets customers quickly search listings for apartments and short-term housing. Apartment hunters can search by a combination of amenities, and view floor plans and photos. You can even get a "virtual walk-through" of some listings, thanks to unique Rent.Net software. Would-be tenants can then submit inquiries online that transmit directly to the leasing agents' fax machines.

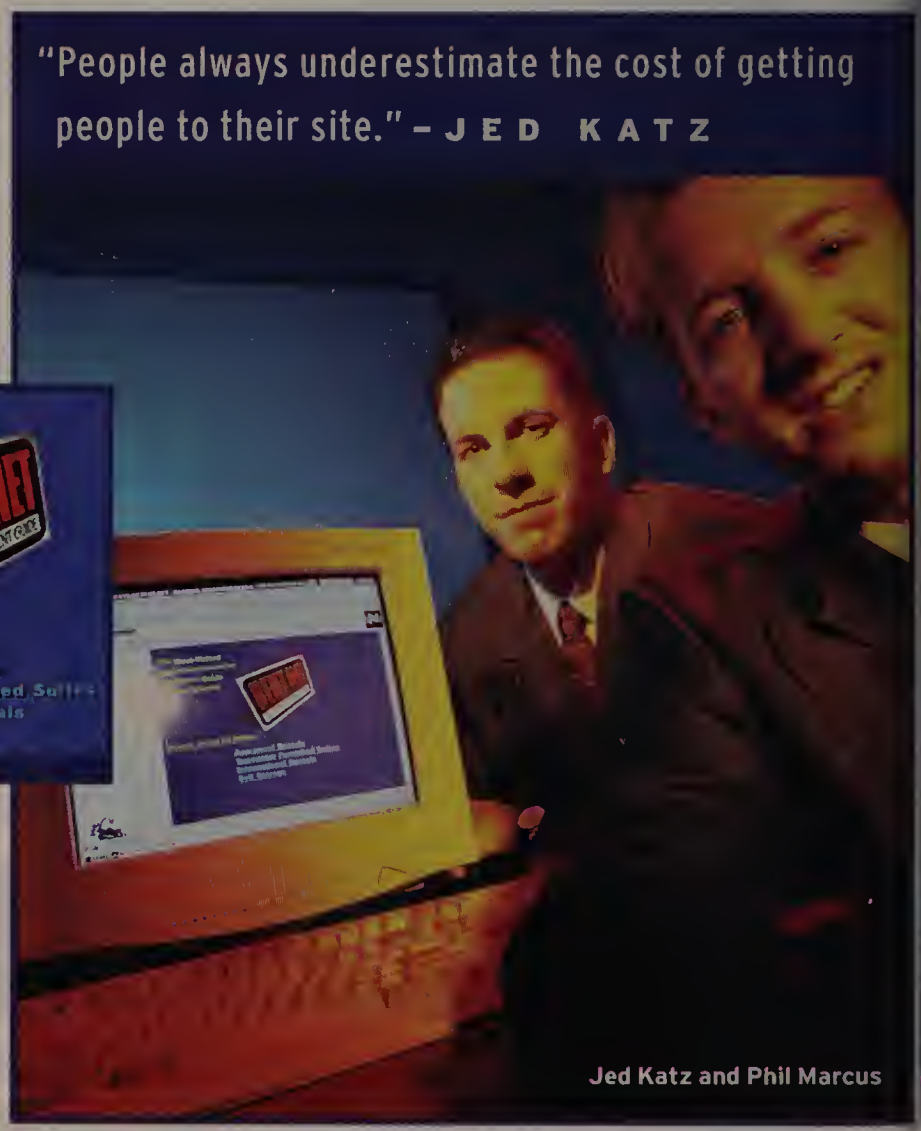
Katz and Marcus financed their venture with personal funds, a bank loan, and credit from office supply stores. The partners hired an outside firm to handle site setup duties so that they could concentrate on Rent .Net's strengths: content and customer service.

Their focus on consumers has paid off. After two years in business, Rent.Net has 45 employees and includes listings for over 1200 U.S. cities. The effort is funded by apartment owners and Web advertisers. Most of the revenue goes to marketing and advertising.

Rent.Net runs banner ads on general interest sites like search engines. But exposure isn't cheap: Katz estimates Rent.Net's monthly advertising costs in the tens of thousands of dollars.

The Net provides Rent.Net with another edge over printed housing guides—content decisions are made and implemented the same day. "There are no barriers on the Internet like there are in print," says Katz. ■

COMPANY: Rent.Net
SELLS: Rental listings and relocation services
EMPLOYEES: 45
DESIGNED OWN SITE? no
MONTHLY COST: "tens of thousands of dollars"



Jed Katz and Phil Marcus

PHOTOGRAPH: EDDIE DANT

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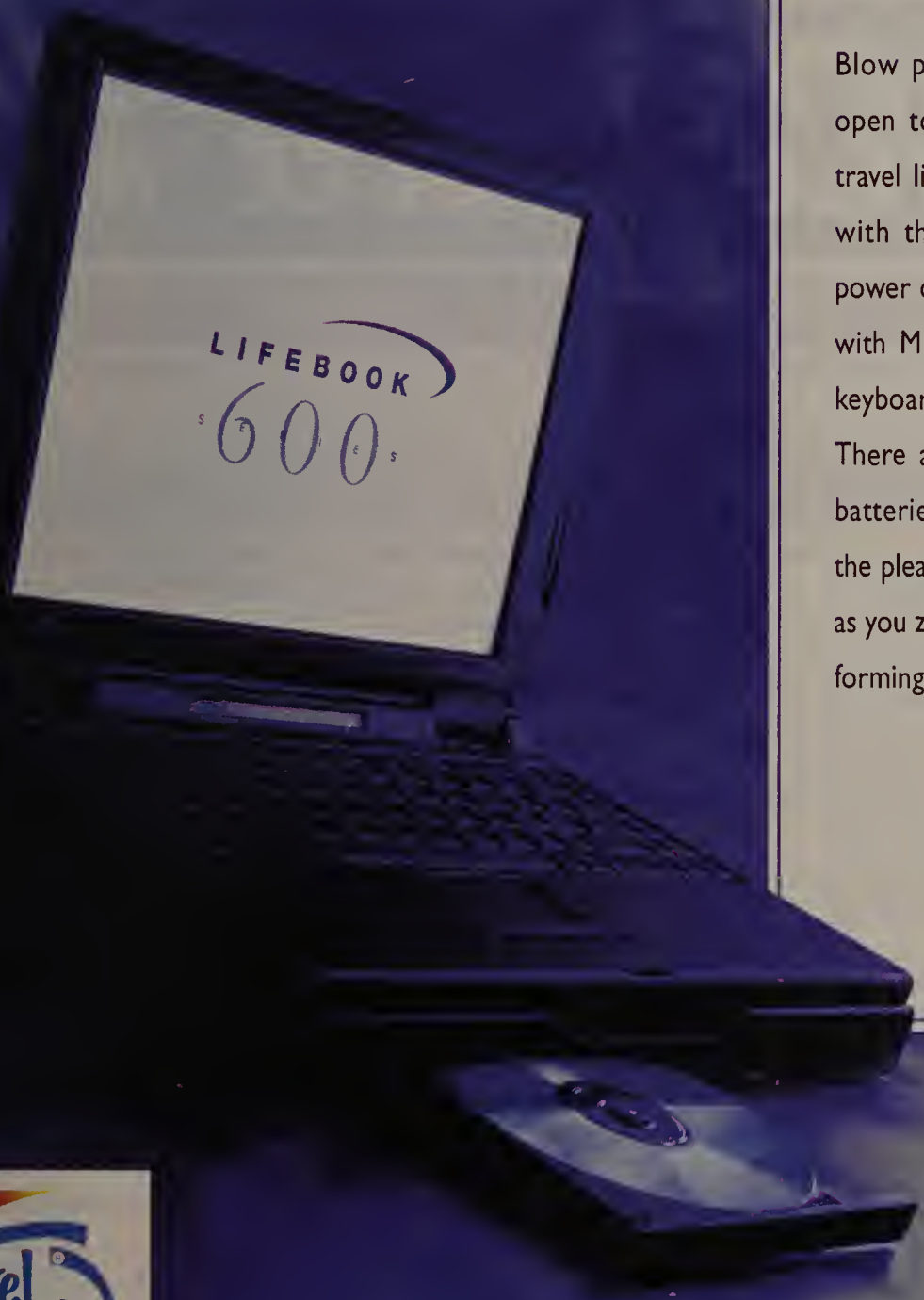

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Common features: ◆ Mini Tower Model ◆ 512KB L2 Cache ◆ 2 Universal Serial Bus (USB) Ports ◆ Microsoft® Office 97 Small Business Edition ◆ MS® Windows® 95 ◆ MS Mouse (MS IntelliMouse on XPS System) ◆ 3 Year Limited Warranty[†] with 1 Year On-site[Δ] Service **Upgrades:** ◆ 3Com® 3C905 Fast EtherLink® XL 10/100 PCI Card, add $109. ◆ 4/8GB EIDE TR4 TBU, add $199. ◆ HP LaserJet 6Pse Printer, $799. ◆ 3-Pak of Zip 100MB Cartridges, add $39.

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Common features listed above plus: • 64MB EDO Memory with ECC • *NEW* 6.4GB Hard Drive with 512KB Cache (9.5ms) • 1000HS Trinitron® Monitor (15.9" v.i.s.) • Matrox Millennium 4MB WRAM Video Card • *NEW* 24X Variable EIDE CD-ROM Drive • Integrated Yamaha 16-Bit Sound • Altec ACS-290 Speakers w/Subwoofer • Iomega Zip 100MB IDE Internal Drive with One Cartridge	Common features listed above plus: • 32MB EDO Memory • *NEW* 6.4GB Hard Drive with 512KB Cache (9.5ms) • *NEW* 1000LS Monitor (15.9" v.i.s.) • Matrox Millennium 4MB WRAM Video Card • *NEW* 24X Variable EIDE CD-ROM Drive • Integrated Yamaha 16-Bit Sound • Altec ACS-90 Speakers • Iomega Zip 100MB IDE Internal Drive with One Cartridge	Common features listed above plus: • 32MB SDRAM Memory • 3.2GB Hard Drive (12ms) • *NEW* 1000LS Monitor (15.9" v.i.s.) • *NEW* 4MB EDO ViRGE 3D Video Card • *NEW* 24X Variable EIDE CD-ROM Drive • Sound Blaster 16 WaveSynth Wavetable Sound • Altec ACS-90 Speakers • Iomega Zip 100MB IDE Internal Drive with One Cartridge ★ *Upgrade to 64MB SDRAM, add $239.*	Common features listed above plus: • 32MB SDRAM Memory • 3.2GB Hard Drive (12ms) • 800HS Trinitron Monitor (13.7" v.i.s.) • *NEW* 4MB EDO ViRGE 3D Video Card • 16X Variable EIDE CD-ROM Drive • AWE32 Wavetable Upgrade Card • Altec ACS-90 Speakers ★ *Upgrade to a 4.3GB Hard Drive (9.5ms), add $60.* ★ *Upgrade to a 1000LS Monitor (15.9" v.i.s.), add $119.*
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Upgrades: ◆ HP DeskJet 820Cse Color Printer, add $299. ◆ Iomega Zip 100MB IDE Internal Drive w/ One Cartridge, add $99. ◆ 3 yrs. On-site Service, add $99.

***NEW* DELL DIMENSION XPS H266** 266MHz PENTIUM II PROCESSOR	***NEW* DELL DIMENSION XPS M233s** 233MHz PENTIUM PROCESSOR W/MMX	**DELL DIMENSION XPS M200s** 200MHz PENTIUM PROCESSOR W/MMX	**DELL DIMENSION M166a** 166MHz PENTIUM PROCESSOR W/MMX
Common features listed above plus: • 64MB EDO Memory with ECC • *NEW* 6.4GB Hard Drive with 512KB Cache (9.5ms) • 1000HS Trinitron Monitor (15.9" v.i.s.) • *NEW* Matrox Millennium II 8MB WRAM Video Card • *NEW* 24X Variable EIDE CD-ROM Drive • Yamaha 32 Wavetable Sound • Altec ACS-490 Full Dolby® Surround Sound Speakers with Subwoofer • Iomega Zip 100MB IDE Internal Drive with One Cartridge	Common features listed above plus: • 32MB SDRAM Memory • *NEW* 6.4GB Hard Drive with 512KB Cache (9.5ms) • 1000HS Trinitron Monitor (15.9" v.i.s.) • Matrox Millennium 4MB WRAM Video Card • *NEW* 24X Variable EIDE CD-ROM Drive • Sound Blaster 16 WaveSynth Wavetable Sound • Altec ACS-290 Speakers with Subwoofer ★ *Upgrade to 64MB SDRAM, add $239.*	Common features listed above plus: • 32MB SDRAM Memory • 4.3GB Hard Drive (9.5ms) • *NEW* 1000LS Monitor (15.9" v.i.s.) • *NEW* 4MB EDO ViRGE 3D Video Card • 16X Variable EIDE CD-ROM Drive • Sound Blaster 16 WaveSynth Wavetable Sound • Altec ACS-90 Speakers ★ *Upgrade to a 6.4GB Hard Drive with 512KB Cache (9.5ms), add $75.* ★ *Upgrade to Altec ACS-290 Speakers with Subwoofer, add $75.*	Common features listed above plus: • 16MB SDRAM Memory • 2.1GB Hard Drive (12ms) • 800HS Trinitron Monitor (13.7" v.i.s., .26dp) • 2MB EDO ViRGE 3D Video • 16X Variable EIDE CD-ROM Drive • Sound Blaster 16 PnP Sound Card • Altec ACS-90 Speakers ★ *Upgrade to 32MB SDRAM, add $119.* ★ *Upgrade to a 3.2GB Hard Drive (12ms), add $49.*
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Common features listed above plus:
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- 2MB EDO ViRGE 3D Video
- 16X Variable EIDE CD-ROM Drive

★ *Upgrade to 32MB SDRAM, add $119.*
★ *Upgrade to a 3.2GB Hard Drive (12ms), add $49.*
★ *Upgrade to an 800HS Trinitron Monitor (13.7" v.i.s., .26dp), add $49.*

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Common features: ◆ 512KB L2 Cache ◆ Integrated Ultra-Wide SCSI-3 Controller ◆ Intel® EtherExpress™ Pro/100 NIC ◆ Intel LANDesk® Server Manager v2.5x ◆ Dell Server Assistant CD ◆ 3 Year Limited Warranty†

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266MHz PENTIUM II PROCESSOR
Dual Processor Capable, RAID Capable

Common features listed above plus:
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- 8X SCSI CD-ROM Drive
- MS Windows NT® Server 4.0

★ *Upgrade to a 9GB Ultra-Wide SCSI-3 Hard Drive, add $450.*
★ *Upgrade to 128MB ECC EDO Memory, add $220.*

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Business Lease: $179/Mo.
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Dual Processor Capable, RAID Capable

Common features listed above plus:
- 32MB ECC EDO Memory
- 2GB Ultra-Wide SCSI-3 Hard Drive [7200 RPM, 8ms] (27GB Max.)
- 8X SCSI CD-ROM Drive
- 3Com OfficeConnect Hub 8/TPC

★ *Upgrade to 64MB Memory, add $239.*
★ *Upgrade to a 4GB Ultra-Wide SCSI-3 Hard Drive, add $320.*
★ *4/8GB SCSI DAT Tape Backup, add $749.*

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NEW DELL LATITUDE® LM M166ST
166MHz PENTIUM PROCESSOR W/MMX

Common features listed above plus:
- 12.1" SVGA Active Matrix Display
- 40MB RAM (72MB Max.)
- 2.1GB Hard Drive
- 2nd Lithium Ion Battery
- MS Office 97 Small Business Edition

★ *Upgrade to 72MB RAM, add $299.*
★ *Motorola 33.6 Fax Modem, add $169.*
★ *3Com LAN+ 33.6 Modem PC Card, add $349.*
★ *Dell Latitude LM Port Replicator, add $159.*
★ *Leather Carrying Case, add $129.*

$3999‡

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NEW DELL LATITUDE LM M166ST
166MHz PENTIUM PROCESSOR W/MMX

Common features listed above plus:
- 12.1" SVGA Active Matrix Display
- 24MB RAM (72MB Max.)
- 2.1GB Hard Drive
- MS Office 97 Small Business Edition

★ *Upgrade to 40MB RAM, add $199.*
★ *2nd Lithium Ion Battery, add $199.*
★ *Motorola 33.6 Fax Modem, add $169.*
★ *Leather Carrying Case, add $129.*
★ *3Com 10Base-T Network Card, add $139.*
★ *Dell Latitude LM Port Replicator, add $159.*

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NEW DELL LATITUDE LM M166ST
166MHz PENTIUM PROCESSOR W/MMX

Common features listed above plus:
- 12.1" SVGA Active Matrix Display
- 16MB RAM (72MB Max.)
- *NEW* 1.6GB Hard Drive
- MS Office 97 Small Business Edition

★ *Upgrade to 40MB RAM, add $299.*
★ *Upgrade to a 2.1GB Hard Drive, add $200.*
★ *2nd Lithium Ion Battery, add $199.*
★ *Motorola 33.6 Fax Modem, add $169.*
★ *Dell Latitude LM Port Replicator, add $159.*
★ *Nylon Carrying Case, add $69.*

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133MHz PENTIUM® PROCESSOR

Common features listed above plus:
- 12.1" SVGA Active Matrix Display
- 16MB RAM (72MB Max.)
- *NEW* 1.6GB Hard Drive

★ *Upgrade to 24MB RAM, add $100.*
★ *Upgrade to a 2.1GB Hard Drive, add $200.*
★ *2nd Lithium Ion Battery, add $199.*
★ *Motorola 33.6 Fax Modem, add $169.*
★ *Nylon Carrying Case, add $69.*
★ *3Com 10Base-T Network Card, add $139.*

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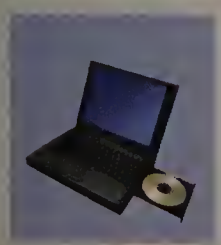

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Circle 146 on reader service card

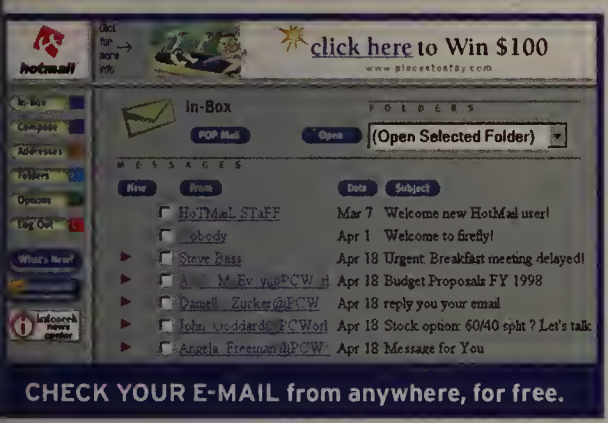
Hot Picks for the Home Office

These are a few of our favorite things.

BY STEVE BASS

READ IT WHILE IT'S HOT

AS SOON AS this article's finished, I'm going on vacation—without a computer. But I'll still be able to check my e-mail from anywhere in the world—even an Internet café in Topeka. All I'll need is access to a PC with an Internet connection, a Web browser, and an account with Hotmail, a free Web-based e-mail service. I surf over to www.hotmail.com, type in my password, and I'm ready to send and receive messages. I can attach image files or text documents to the messages, send copies to "blind" and "cc" recipients, and create a permanent address book. Hotmail also checks for e-mail sent to accounts with other ISPs, so no matter how far out I go, I'm never out of touch. **Hotmail** free; 408/222-7000; www.hotmail.com



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EVERYTHING BUT THE KITCHEN SINK

IT'S A COLOR PRINTER. Hold on—no, it's a fax machine. Wait a minute—there's also a scanner with optical character recognition. And would you believe you can use it as a copier?

Hewlett-Packard's OfficeJet 570 combines all four devices into one 17-by-15-by-10-inch package. The OfficeJet 570 prints at 600 dots per inch in black and white and 300 dpi in color, cranking out monochrome documents at about 4 pages per minute and sharp color pages at 1 ppm. A 65-page fax memory lets you leave the office without worry while the faxes pile up; the 300-dpi black-and-white scanner comes with OmniPage Limited Edition software for turning scanned pages into editable text. Copying capabilities are nothing to write home about, but the other features make the OfficeJet a bargain. Okay, so it ▶

OfficeJet 570

PHOTOGRAPHS: PETER BELANGER

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Circle 233 on reader service card

P-Touch Home & Hobby II

won't heat up my danish, but it's convenient and fits snugly into a corner of my already crowded office. **OfficeJet 570** $499 list; Hewlett-Packard; 800/752-0900, www.hp.com.

READER SERVICE NO. 646

LICKETY-SPLIT LABELS

PICTURE THIS: You need a quick label to stick on a storage shelf. Or maybe to identify a piece of equipment as yours (especially if your spouse keeps trying to claim it). Instead of firing up the computer, try using Brother's P-Touch Home & Hobby II, a clever little label maker. I just type the characters into a miniature keypad and voilà—out pops a label. In no time I found dozens of places to attach labels, from each of the dozen cables snaking from my computer to a modem switching box. The P-Touch handles labels in four sizes, prints up to two lines, and uses both 3/8-inch and 1/2-inch tape. It has a small footprint of about 4 by 6 by 2 inches, and uses six AA batteries. Essential? No. Handy? Absolutely. **P-Touch Home & Hobby II** $50 street; Brother; 888/879-3232, 714/859-9700; www.brother.com/us-label/lineup-us.html.

READER SERVICE NO. 647

PICK A CARD, ANY CARD

LAST MONTH I had a great idea on how to increase membership in my local PC user group: Hang out at computer trade shows and pass out my business cards with "free admission" printed on the flip side. Instead of giving the job to a local quick print shop, I saved a little money by designing and printing the cards myself with My Professional Business Cards. In less than 20 minutes, I had a stack of sharp-looking business cards ready to go. The program runs on Windows 3.*x* and Windows 95, and includes 95 predesigned business card templates for the artistically impaired, more than 1000 graphic images (or you can use your own—it imports a dozen graphics formats), and enough fancy card stock for 300 business cards. Now, isn't it time *you* cooked up some new business cards? **My Professional Business Cards** $29 street; MySoftware Company; 800/325-3508, 415/473-3600; www.mysoftware.com/.

READER SERVICE NO. 648

BUSINESS SMARTS

HERE'S A CARDINAL business rule: You can't get where you want to be if you don't know where you're going. A solid business plan is not only essential when you're starting out, it's also a useful refresher for an existing business. The Smart Business Plan CD-ROM guides you through plan development, handling topics such as market analysis, product and service descriptions, marketing objectives, financing, and cost control—with examples and instructions for businesses from service and manufacturing to wholesale and retail. A text editor and spreadsheet are built in, but what makes Smart Business Plan easy to use is the split screen that lets you view sample plans while writing your own. The program runs on Windows 3.*x* or Win 95. **Smart** ▶

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READER SERVICE NO. 650

TURN RIGHT ONTO THE WORLD WIDE WEB

PLANNING AN important business meeting over a pastrami sandwich? Impress your clients by supplying them a detailed map to Jerry's Deli, along with driving directions. The best part is that you won't have to spend a dime for the software. All you need is an Internet connection and a browser; MapBlast does the rest. Just log on to MapBlast's Web page, fill in the location's address, and watch the map appear. Creating a detailed road map is equally easy: Just enter your starting point and destination point. And don't bother printing and mailing the map—simply type in your client's e-mail address and MapBlast sends the the URL via e-mail, letting the other person grab their own copy. **MapBlast** free; www. mapblast.com/.
READER SERVICE NO. 651

PASS THE REMOTE

WANT TO KEEP track of the news while you're at work? How about your favorite soaps? You can with ATI-TV, a cool add-in card that transforms your computer into a TV set. Besides turning you into a desk potato, the ATI-TV doubles as a video capture card, making it ideal for grabbing images or movie clips from TV. Even better, if you have teleconferencing software you can connect a video camera to the ATI-TV card and use it for Internet videoconferencing. The card uses signals from cable TV or an antenna, and connects to an ATI video card or a card with a proprietary ATI Multimedia Channel connector. You can view thumbnails of several channels at once, then click on one for a full screen. You can even tell the ATI-TV to look for specific words in a channel's closed captioning and begin transcribing the data to disk. Okay, so watching *General Hospital* won't make my deadlines disappear, but it sure made writing this more fun. **ATI-TV** $99 street; ATI Technologies; 905/882-2600; www.atitech.ca.
READER SERVICE NO. 652

Steve Bass is a PC World *contributing editor.*

For more information on all products in this article, circle reader service no. 905. ■

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PC WORLD

TOP 100

208 Power Desktops

224 Budget Desktops

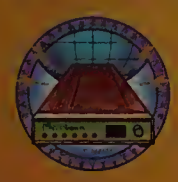
232 Notebooks

247 Printers

251 Monitors

255 Graphics Boards

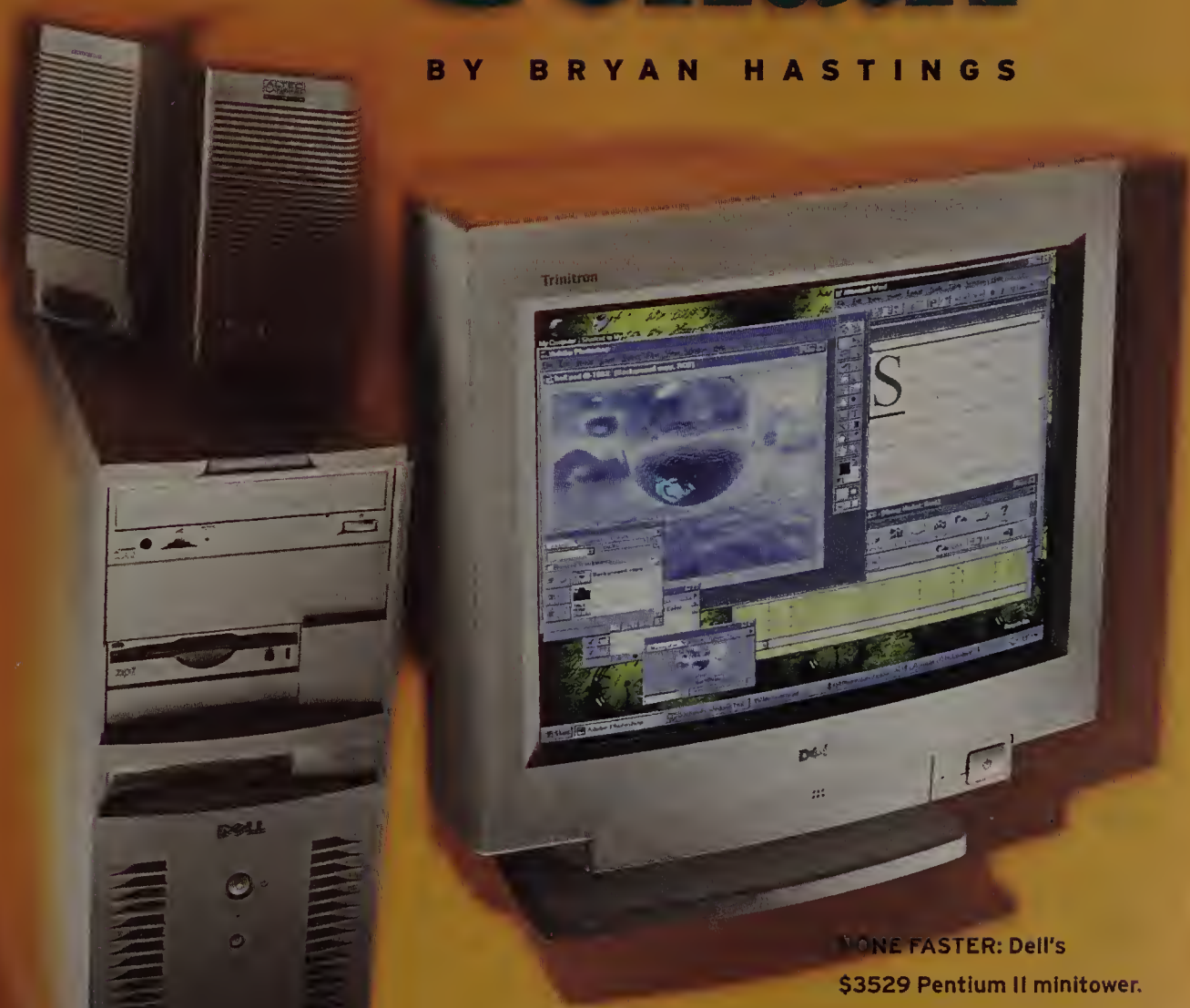
257 Modems



Pentium II and K6:

Goliath vs. Goliath

BY BRYAN HASTINGS



ONE FASTER: Dell's $3529 Pentium II minitower.

THE FIRST PENTIUM II AND K6 systems have finally landed on the Top 20, and they're well worth the wait. Systems based on Intel's Pentium II chip—which combines Pentium Pro power with multimedia-enhancing MMX technology—will lead the next ▶

wave in top-end desktop PCs. And those based on Advanced Micro Devices' K6 processor are powerhouses with great appeal to cost-conscious shoppers.

The four Pentium II systems we tested offer unmatched speed and excellent value. All placed on the Top 20 Power Desktops chart, with Dell's Dimension XPS H266 hitting the top spot. The K6 also made an impressive debut. We tested the Polywell Poly K6200Mx, a $2569 minitower based on the 200-MHz version of AMD's latest chip, and it edged onto the power chart in 20th place. It was about 10 percent slower than 266-MHz Pentium II PCs, but its PC WorldBench score of 241 is still excellent. The Poly K6200Mx is a powerful system for the small or home office—it lacks only speakers.

AMD INSIDE: Polywell's Poly K6200Mx outruns all Pentium MMX-200 PCs.

PENTIUM II: THE CHIP TO BEAT

CALLING A PENTIUM II "fast" is like saying Bill Clinton received tips for his White House coffee councils. The four 266-MHz units we tested turned up PC WorldBench scores from 259 to 263, about 15 percent faster than the average Pentium Pro and Pentium MMX-200 systems we've tested. To get a feel for how far PC performance has advanced in the past two years, we did an informal speed comparison between the Pentium IIs and a Dell Dimension Pentium-75 minitower. Even with all systems loaded with 32MB of RAM, it was like staging a duel between Doc Holliday and Elmer Fudd. The Pentium IIs launched Microsoft Excel faster than the P-75 could switch to an *already running* session of the spreadsheet. Then we tried opening the giant, formula-choked Excel workbook that we use to rate Top 20 desktops. It took the P-75 almost a minute to open the 6MB file; the Pentium IIs did it in about 5 seconds. Even faster 300-MHz Pentium II systems should be available before the end of the year.

As we expected, all the Pentium IIs

YOUR GUIDE TO THE TOP 100

QUESTIONS ABOUT OUR CHARTS? The following section should answer most of them. If not, ask us; see page 14 for contact information.

How do the charts work? The Top 20 and Top 10 charts are evolving lists of the best PCs, monitors, modems, printers, and graphics boards we've tested. The Top 20 charts are divided by price. Power desktops cost $2500 or more; power notebooks cost $2750 or more. Every month we test the latest products in each category and compare them to the pool of items we've already reviewed. As new products earn places on the charts, those at the bottom drop off. Price cuts also cause chart changes.

Where do you get your prices? We estimate street prices based on vendor information and our own research, including surveys of retail outlets. We recheck all prices every month.

What does the overall rating mean? It's the sum of all our tests—both hands-on evaluations and automated speed tests. The scale is 1 to 100, so a product that scores in the 90s is generally considered exceptional, one in the 80s is among the best, one in the 70s is above average, and one that scores lower usually doesn't place.

What does the PC WorldBench score mean? It's a measure of how fast a PC is in relation to our baseline machine, a Dell P75t configured with 8MB of RAM, a 540MB hard drive, and no secondary cache. A PC that scores 200, for instance, is twice as fast as the baseline unit.

Where do the scores for reliability, support quality, and support policies come from? The reliability and support quality scores come from readers who respond to the Reliability and Service fax-back survey in each issue of *PC World*. The policies score is based on the vendor's support policies (such as length of warranty and support hours).

What do all those word scores mean? Word scores for performance and price are based on a product's rating in relation to other products in its category. For example, a budget PC that is rated "expensive" is high priced only in relation to other budget PCs. Likewise, a power notebook rated "good" for performance is good only in relation to other power notebooks. Word scores for other categories, such as features, are relative to all desktops or all notebooks.

Where can I find the online version of the Top 100? Go to PC World Online (www.pcworld.com). There you'll find not only the current issue of *PC World* and reviews for the last 18 months, but some extra features you'll want to check out. For one thing, PC World Online includes reviews you won't find in print. If a product misses a chart and we don't cover it here, you can go directly to an online review by using the URL provided in each Top 100 section.

Have you ever wished you could build your own chart based on your buying criteria? You can, with Buyer's Guide, our Web site's unique chart customizer. Buyer's Guide combines your criteria with *PC World*'s current data and test results to generate customized Top 20s and Top 10s. For instance, if you want your chart to rank notebooks that have 120-MHz processors and 1.6GB hard drives, the guide's Personal Adviser will find and rank all the machines that fit your specifications.

came heavily loaded and cost plenty—ranging from $2899 for Quantex's QP6/266 SM-4 to $4369 for Sys Technology's Performance Pro 266. All are designed as small- or home-office systems, but Dell's $3529 Dimension XPS H266 and the $3239 Gateway 2000 G6-266 M are the best values of the four Pentium IIs we reviewed. Both offer excellent multimedia features, huge 6.4GB hard disks, Iomega Zip drives, voice-enabled modems, and sizable software bundles including Microsoft Office Small Business Edition. Quantex's QP6/266 SM-4 is the lowest-cost Pentium II reviewed here. The Quantex minitower is less loaded than the Dell or Gateway 2000 Pentium II PCs and has only a fair reliability rating, but it's still nicely configured, and its price is terrific.

AMD'S K6-200: MMX KILLER?

THE K6 PROCESSOR should be a hot competitor to the Pentium II. We tested a Polywell Poly minitower with a 233-MHz version of the K6 chip that AMD sent us, and it scored 248 on the WorldBench retest, placing only 5 percent slower than the average of the four Pentium II systems tested this month. If the 233-MHz Poly had the same configuration as the Poly K6200Mx we review this month (a 200-MHz K6 system), it would sell for about $2700. We expect that PCs based on 266-MHz and faster versions of the AMD chip will run an even tighter race with Intel's cutting-edge CPU.

Meanwhile, a K6-200–versus–Pentium MMX battle is brewing for the minds and wallets of budget PC shoppers. At $2569, the Polywell Poly K6200Mx nearly made our Budget Desktops chart, yet it outpaced the fastest Pentium MMX-200 PCs we've tested. Similarly configured Pentium MMX-200 and Pentium Pro-200 power systems are often less of a bargain—they typically sell for about $2900 and average 230 on our benchmark. But Intel Pentium MMX–based desktops should be significantly cheaper by the time you read this. In May, Intel slashed the price of the Pentium MMX-200 processor by 38 percent.

Pentium II and K6 PCs are the big news in power desktops, but we saw several other notable changes. Quantex's reliability rating rose from poor to fair, moving its QP6/200 SM-4 up toward the middle of the chart. IBM's reliability score slid from good to fair, which helped to push the company's PC 350 Pentium MMX-200 and PC 365 models off the chart.

MORE BUDGET MMX DESKTOPS

FIVE OF THE TOP 20 budget systems this month are based on the Pentium MMX chip, including Dell's new Dimension XPS M166s, our top budget Best Buy. The MMX-166 has become the entry-level desktop processor for Dell and Quantex, and both companies have announced plans to phase out all desktop systems based on non-MMX Pentium CPUs.

Among notebooks, Compaq's Armada 1130T plummeted $600 in price to $1399, making this P-120 the top budget portable Best Buy and the cheapest notebook PC with an active-matrix display.

Acer purchased Texas Instruments' mobile-computer division this spring, adding TI's Extensa line to its portable PC offerings and replacing its own Nuovo series with the TravelMate line. No Extensa or TravelMate models are on either Notebooks chart, but the AcerNote Light 382, which is new this month, placed eighth among budget notebooks.

THAT'S OKI: The $999 OkiPage 16n printer.

Desktop Performance Triples

AVERAGE DESKTOP speeds have soared since our March 1996 roundup, when we started using the PC WorldBench test suite. For standard business applications, the Pentium II-266 is over two and a half times as powerful as a Pentium-75. The difference is even greater with software that takes advantage of MMX, such as many multimedia applications.

CPU	Average PC WorldBench score
Intel Pentium-75	99
Intel Pentium-100	154
Intel Pentium-133	178
Intel Pentium-166	196
Cyrix Cx6x86-P166+	203
Intel Pentium-200	210
Intel Pentium MMX-200	229
Intel Pentium Pro-200	229
AMD K6-PR200[1]	241
Intel Pentium II-266[2]	262

[1] Based on one system, the Polywell K6200Mx, tested this month.
[2] Based on four Pentium II systems, all tested this month.

PRINTER PRICES DROP

IF YOU NEED A PRINTER for a department or small office, check out the Top 10 Workgroup Printers. At $999, the monochrome Okidata OkiPage 16n is the first sub-$1000 printer on the chart, and HP slashed the price of its Color LaserJet 5M by $2196 to a more palatable $5199.

Bryan Hastings is a PC World *senior associate editor. Assistant Editor Grace Aquino, Editorial Researcher Julie Campagna, Staff Editors John Goddard and Eric Hellweg, Editorial Assistant Mick Lockey, Associate Editors Melissa Riofrio and JoAnne Robb, and freelance writers Jon Jacobi, Dan Littman, Jim Martin, and Kirk Steers contributed to the Top 100. Testing by Ulrike Diehlmann, Robert James, Elliott Kirschling, Jeffrey Kuta, Mike Salayko, and Susan Silvius.* *See page 14 for contact information.*

PC WORLD

TOP 20 POWER DESKTOPS

	SYSTEMS	Last month	Month tested	Street price (4/15/97)	CPU	Comments
1	Dell Dimension XPS H266 800/388-8542 www.dell.com	–	NEW	$3529	Pentium II-266	Killer speed, giant hard drive, great multimedia, top reliability rating.
2	Dell Dimension XPS M200s 800/388-8542 www.dell.com	1	Mar 97	$2579	Pentium MMX-200	$120 price drop on high-end MMX; outperforms Pentium Pro sibling.
3	Dell Dimension XPS Pro200n 800/388-8542 www.dell.com	2	Jan 97	$2779	Pentium Pro-200	Fast, feature-packed; $220 cut this month; easy to upgrade.
4	Dell OptiPlex GXi 200M 800/388-8542 www.dell.com	3	June 97	$3255	Pentium MMX-200	Do-it-all corporate desktop with ethernet, multimedia, voice modem.
5	Micron Millennia Pro2 200 B 888/634-8799 www.micronpc.com	4	Feb 97	$2738	Pentium Pro-200	Fast, thoroughly loaded; down $221 this month.
6	Gateway 2000 G6-266 M 800/846-2000 www.gw2K.com	–	NEW	$3109	Pentium II-266	Tied for fastest with number one Dell; great speakers, 56-kbps modem.
7	Gateway 2000 G6-200 800/846-2000 www.gw2K.com	5	Dec 96	$2549	Pentium Pro-200	$140 drop on fast SCSI-equipped workgroup server candidate.
8	Dell OptiPlex GX Pro 200 800/388-8542 www.dell.com	–	retested	$3246	Pentium Pro-200	Reviewed in May, now has updated BIOS, faster modem, costs over $1000 less.
9	Quantex QP6/266 SM-4 800/896-4898 www.quantex.com	–	NEW	$2899	Pentium II-266	Blazingly fast Pentium II comes with very sharp screen; pricey.
10	HP Vectra VA 6/200 MT 800/752-0900 www.hp.com	7	Mar 97	$3183	Pentium Pro-200	Nice corporate PC has top reliability record, but support hours are limited.
11	HP Pavilion 7370V 800/724-6631 www.hp.com	10	May 97	$3448	Pentium MMX-200	Good software bundle; pricey, only one year of free tech support.
12	Quantex QP6/200 SM-4 800/896-4898 www.quantex.com	18	May 97	$2649	Pentium Pro-200	Very fast for the price; Quantex reliability rating moves from poor to fair.
13	Sys Technology Sys Performance P200T2M 800/613-9963 www.systechnology.com	–	NEW	$2657	Pentium MMX-200	Speedy low-cost minitower comes with sharp monitor; one-year warranty.
14	Netis N6200PCI 800/577-7526 www.netistech.com	11	Dec 96	$2580	Pentium Pro-200	Fast tower can take two CPUs; Netis now offers support on the Web.
15	Sys Technology Performance Pro 200 800/613-9963 www.systechnology.com	13	Dec 96	$2849	Pentium Pro-200	Superfast, good graphics card; otherwise fairly generic; $80 price drop.
16	Multiwave P-200 MMX 800/234-3358 www.mwave.com	14	June 97	$2750	Pentium MMX-200	Very fast, good graphics; support policies could be better.
17	CLR Infinity P-200 MMX 800/611-1555 www.clrusa.com	16	Apr 97	$2629	Pentium MMX-200	$94 price drop keeps fast minitower on chart; monitor only 15 inches.
18	Sys Technology Performance Pro 266 800/613-9963 www.systechnology.com	–	NEW	$4369	Pentium II-266	Only Dell, Gateway P-IIs above are faster; expensive, warranty just one year.
19	Acma zPower Pro-200 800/786-6888 www.acma.com	19	Jan 97	$2695	Pentium Pro-200	Fast, good graphics board, but CD-ROM drive looks a little slow now.
20	Polywell Poly K6200Mx 800/999-1278 www.polywell.com	–	NEW	$2569	AMD K6-PR200	First K6 PC tested for Top 20. Great price, very fast, loaded; short tech hours.

Best Buy See features chart, page 210; performance chart, page 214. Recommended as home system

[1] To order fax copies of system reviews, call 800/434-4495 from a touch-tone phone and use your credit card. You can order next month's reviews in advance: Power Desktops, Budget Desktops, or Notebook PCs Top 20 charts and capsule reviews ($9.95, available May 27).

PENTIUM II SYSTEMS MAKE A BIG SPLASH, with three of the four tested landing in the top half of the chart. Of the systems that didn't place, Toshiba's Infinia 7201 is the standout. It's hampered by a merely fair reliability rating, but this elegant MMX-200 desktop sets the pace for home systems. The Infinia comes with a huge software bundle and with TV and radio built in, plus very good multimedia and a fast modem, as well as extensive easy-to-follow documentation. It's also one of the few PCs with connectors that let you hook up a video source, such as a VCR, and display the video on the computer screen. For reviews of the Infinia and other systems, visit PC World Online (www.pcworld.com/t20pcsnaps).

SCORECARD

★ Overall rating	PC WorldBench score/performance	Vendor's system reliability	Features and design	Price	Vendor's support quality/policies	Fax reprint number[1]	Reader service number
95	263/outstanding	best	outstanding	average	best/best	–	678
93	234/very good	best	very good	very inexpensive	best/best	3494	679
92	230/very good	best	very good	inexpensive	best/best	3474	680
90	226/very good	best	outstanding	average	best/best	3534	681
88	231/very good	good	very good	inexpensive	best/best	3489	682
87	263/outstanding	fair	good	average	best/best	–	683
87	234/very good	fair	very good	very inexpensive	best/best	3458	684
87	230/very good	best	good	average	best/best	–	685
86	259/outstanding	fair	good	inexpensive	good/best	–	686
86	229/very good	best	very good	average	good/poor	2496	687
82	222/very good	best	good	average	good/fair	3515	688
82	230/very good	fair	good	inexpensive	good/best	3518	689
82	233/very good	[2]	very good	inexpensive	[2]/fair	–	690
81	230/very good	[2]	very good	very inexpensive	[2]/fair	3460	691
80	236/outstanding	[2]	very good	inexpensive	[2]/fair	3459	692
80	235/outstanding	[2]	very good	inexpensive	[2]/fair	3535	693
80	229/very good	[2]	very good	very inexpensive	[2]/good	3536	694
79	262/outstanding	[2]	very good	very expensive	[2]/fair	–	695
79	231/very good	[2]	very good	inexpensive	[2]/fair	3515	696
78	241/outstanding	[2]	good	very inexpensive	[2]/good	–	697
Scorecard weightings ▶	Performance 25 percent	Reliability 25 percent	Features 20 percent	Price 15 percent	Support 15 percent	All products:	908

[2] Insufficient data.

This Month's Best Buys

1 DELL DIMENSION XPS H266

PRO: Lightning fast, very good features, top-notch support policies and service and reliability

CON: None significant

If Dell's $3699 Dimension XPS H266 is any indication, the Pentium II processor deserves all the fanfare it's been getting. This terrific home-office system ran up a PC WorldBench score of 263, the best ever.

The Dimension XPS H266 is a very high-end machine in all respects. The H266's Matrox Millennium II card, a habitué of our monthly Top 10 Graphics Boards chart, is one of the first to have 8MB of video memory, great for 3-D. The 17-inch monitor produces exceptionally crisp and flicker-free images. The 12X CD-ROM drive, wavetable-equipped Yamaha sound board, and Altec Lansing ACS 90 satellite speakers and ACS2 90 subwoofer comprise a great multimedia setup. The speakers pack enough wallop that you could, in a pinch, use this minitower as a sound system for home parties.

Dell Dimension XPS H266

The H266 comes with a huge 6.4GB hard drive, plus all the communications components of a home office. Using the included voice-enabled U.S. Robotics 33.6-kbps modem (the Sportster is a Top 10 perennial), you can have the H266 take phone messages and receive faxes. The software bundle includes Microsoft Office Small Business Edition. It's also one of a few systems to sport an Iomega Zip drive, which accepts 100MB storage disks that are not much bigger than floppies.

Our biggest complaint is the documentation, which is split into separate booklets for the main system and each peripheral. While these manuals are excellent, they'd be more convenient to use if integrated into one package. Also, while you can hand-turn a large screw to remove the minitower's side panel, pulling the panel on and off takes some finagling.

Completing the picture is Dell's excellent service and reliability record. In the latest fax-back survey responses, *PC World* readers continue to report high satisfaction with Dell's PC reliability and with the support they get from the company. Dell backs its Dimension PCs with a three-year warranty on parts and one year for labor, on-site service for the first year, and round-the-clock technical support.

2 DELL DIMENSION XPS M200S

PRO: Very fast; components, software bundle, service quality, and reliability rating are all tops

CON: Maximum RAM limited to 64MB

After four months at the head of the chart, the XPS M200s is unseated by Dell's Pentium II entry. But it remains a solid runner-up. This Pentium MMX-200 minitower has a winning combination of speed, high-quality components, good design, and ▶

TOP 20 POWER DESKTOPS — STANDARD FEATURES

	SYSTEMS	CPU	RAM (MB)	Secondary cache (K)	Hard drive (GB)	Graphics adapter	Video RAM (MB/type)	Monitor tube/ viewable diagonal (inches)	Screen pitch (mm)	CD-ROM drive speed
1	Dell Dimension XPS H266*	Pentium II-266	32	512	6.4	Matrox Millennium II	8/WRAM	17/15.9	.25	12X
2	Dell Dimension XPS M200s*	Pentium MMX-200	32	512	3.2	Matrox Millennium	4/WRAM	17/15.8	.28	12X
3	Dell Dimension XPS Pro200n*	Pentium Pro-200	32	256	3.2	Number Nine Imagine 128 II	4/VRAM	17/15.6	.28	12X
4	Dell OptiPlex GXi 200M*	Pentium MMX-200	32	512	3.2	Matrox Millennium	4/VRAM	17/16	.28	8X
5	Micron Millennia Pro2 200 B*	Pentium Pro-200	32	256	3.1	Diamond Stealth 3D 2000	4/EDO DRAM	17/16	.26	12X
6	Gateway 2000 G6-266 M	Pentium II-266	32	512	6.4	STB Virge GX	4/EDO DRAM	17/15.9	.28	12X
7	Gateway 2000 G6-200	Pentium Pro-200	32	256	2.1	STB Velocity 3D	4/VRAM	17/15.9	.26	12X
8	Dell OptiPlex GX Pro 200	Pentium Pro-200	32	512	3.1	Matrox Millennium	4/WRAM	17/15.8	.28	8X
9	Ouantex QP6/266 SM-4	Pentium II-266	32	512	4.3	Matrox Millennium II	4/WRAM	17/16.1	.25	12X
10	HP Vectra VA 6/200 MT	Pentium Pro-200	32	256	2.5	Matrox Millennium	2/WRAM	17/15.7	.28	8X
11	HP Pavilion 7370V	Pentium MMX-200	32	256	4	integrated	2/EDO DRAM	17/15.6	.28	16X
12	Ouantex QP6/200 SM-4	Pentium Pro-200	64	256	3.2	Matrox Millennium	4/WRAM	17/16.1	.26	12X
13	Sys Technology Sys Performance P200T2M	Pentium MMX-200	32	512	3.2	Diamond Stealth 3D 3000	4/VRAM	17/15.8	.26	12X
14	Netis N6200PCI	Pentium Pro-200	32	256	2.1	Matrox Millennium	2/WRAM	17/15.1	.28	8X
15	Sys Technology Performance Pro 200	Pentium Pro-200	32	256	2.5	Matrox Millennium	2/WRAM	17/15	.26	12X
16	Multiwave P-200 MMX	Pentium MMX-200	32	512	2.1	Matrox Millennium	4/WRAM	17/16	.26	12X
17	CLR Infinity P-200 MMX	Pentium MMX-200	32	512	3.2	Number Nine Imagine 128	4/VRAM	15/13.7	.28	12X
18	Sys Technology Performance Pro 266	Pentium II-266	32	512	4.3	Matrox Millennium	4/WRAM	17/15.8	.26	12X
19	Acma zPower Pro-200	Pentium Pro-200	32	256	2.1	STB Velocity 3D	4/VRAM	17/15.5	.28	8X
20	Polywell Poly K6200Mx	AMD K6-PR200	32	512	5.1	Diamond Stealth 3D 2000	4/EDO DRAM	17/15.8	.28	12X

* Best Buy [1] Five years on CPU and main RAM, three years on other parts. [2] Download only, upload at 33.6 kbps. [3] Toll call. [4] 24 hours daily for first year.

top-rated service. It sells for a near-budget $2579, thanks to a $120 price drop.

With a WorldBench score of 234, this home-office contender is faster than most Pentium Pros but is priced far lower. The multimedia setup is great, including Altec Lansing's ACS 290 speakers with subwoofer. A 3.2GB hard drive provides ample storage. Communications are handled by a U.S. Robotics 33.6-kbps voice modem and Vocal Point phone/fax/data software. Also in the software bundle is Microsoft Office Professional, a top-rated suite of business applications. The system's 4MB Matrox Millennium card, while not a high-end, workstation-class board, is excellent for general graphics chores. Keep in mind that the M200s is limited to 64MB of system memory—only half the amount most PCs can take. Users of programs such as Photoshop and other demanding graphics software might want to be able to add more.

Dell Dimension XPS M200s

The case is easy to open. Turn a thumbscrew, and the side panel comes off to reveal an impeccably clean interior with plenty of free slots and bays.

Dell's system documentation is thorough and easy to understand, and the company's support policies are superb, although its labor warranty recently dropped from three years to one. Dell's PC reliability rates among the best, according to *PC World* readers.

3 DELL DIMENSION XPS PRO200N

PRO: Very fast, has both top reliability rating and excellent support

CON: None significant

Even with a $220 price cut this month, the $2779 XPS Pro200n is more expensive and a tad slower than its higher-ranking MMX-200 sibling. But this powerful minitower is a good choice for a Windows NT workstation, thanks to its Pentium Pro-200 processor. The features that hike up the Pro200n's price are the extra 256K of secondary cache and a high-end graphics card, the Number Nine Imagine 128 II, that costs $300 more than the Matrox Millennium. Other features of the Pro200n and M200s are very similar, including

		EXPANDABILITY						CUSTOMER SUPPORT			
Modem speed (kbps)	Sound board	Case style	Max. RAM (MB)	Maximum secondary cache (K)	Open RAM sockets	Open drive bays (ext./int.)	Open slots	Warranty for parts/labor (years)	Weekday toll-free support (hours)	Weekend support	Online support
33.6	integrated Yamaha OPL3-Sax	minitower	128	512	2	2/1	4	3/1	24	Sat., Sun.	BBS, CIS, WWW
33.6	integrated Vibra 16c	minitower	64	512	1	2/1	3	3/1	24	Sat., Sun.	BBS, CIS, WWW
33.6	Sound Blaster AWE32	minitower	128	512	2	3/1	4	3/1	24	Sat., Sun.	BBS, CIS, WWW
33.6	integrated Vibra	desktop	512	512	3	1/0	3	3/1	24	Sat., Sun.	BBS, CIS, WWW
33.6	integrated Sound Blaster 32	minitower	512	512	3	3/0	4	3 [1]/1	24	Sat., Sun.	CIS, WWW
56 [2]	Ensoniq Audio PCI	minitower	128	512	2	1/2	2	3/3	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW
–	Ensoniq Soundscape Vivo 90	tower	256	256	2	3/6	4	3/3	24	Sat., Sun.	AOL, BBS, CIS, WWW
33.6	Creative Labs Vibra 16s	desktop	512	512	3	1/1	3	3/1	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW
33.6	integrated Yamaha OPL3-Sax	minitower	128	512	0	3/3	4	3/1	24	Sat., Sun.	BBS, WWW
–	Sound Blaster 16 PnP	minitower	192	256	4	2/1	4	3/3	11 [3]	–	AOL, BBS, CIS, WWW
33.6	integrated Yamaha	minitower	128	256	2	2/2	5	1/1	24 [3]	Sat., Sun.	AOL, BBS, CIS, WWW
33.6	Ensoniq Soundscape Vivo 90	minitower	128	256	0	3/3	4	3/1	24	Sat., Sun.	BBS, WWW
33.6	Sound Blaster 32	minitower	512	512	4	3/2	4	1/1	24	Sat., Sun.	–
33.6	Sound Blaster 16 PnP	tower	256	512	6	3/0	5	1/3	10	Sat.	BBS, WWW
33.6	Sound Blaster 32 PnP	minitower	128	512	2	3/1	4	1/1	24	Sat., Sun.	–
33.6	Ensoniq Soundscape Vivo 90	minitower	512	512	2	3/1	4	1/1	10	Sat.	BBS
28.8	Sound Blaster AWE32	minitower	256	512	2	2/0	5	3/3	12	Sat.	WWW
33.6	Sound Blaster 32 PnP	minitower	512	512	4	3/2	2	1/1	24	Sat., Sun.	–
33.6	Sound Blaster 16 PnP	minitower	512	256	2	1/1	4	3/1	10	–	BBS, WWW
33.6	Crystal 16-bit (OEM)	minitower	256	512	2	2/0	4	3/5	11 [4]	Sat.	BBS, WWW

their generous software bundles.

The Pro200n also has the same minitower case as the M200s. The CD-ROM drive is located at the top of the front panel, making it easily accessible, and the power and reset buttons lie in the center of the panel, well away from the floppy disk eject button. The interior is roomy, and the four free slots and four free bays are easy to get to, but better ventilation may be needed. The processor's heat sink singed our hands when we touched it, despite the presence of a big cooling fan.

Dell XPS Pro200n

The support policies for this system mirror those of its XPS M200s sibling: You get a three-year parts warranty and one year for labor, and round-the-clock toll-free support that gets a great rating in our reader fax-back surveys. Readers also give Dell excellent marks for system reliability.

4 DELL OPTIPLEX GXI 200M

PRO: Fast; above-average service, support, and system reliability

CON: Expensive, limited expandability

Like all OptiPlex models, this $3255 minitower isn't for the faint of budget. But it has everything you need in a high-end corporate desktop: snappy performance, bountiful storage, built-in networking, and some of the best support available.

Price is a major difference between the Dimension and OptiPlex lines: The OptiPlex GXi 200M costs $676 more than the number two Dimension XPS M200s. But that isn't too surprising considering one of the major extras: OptiPlex systems are geared for network use. Thanks to the integrated ethernet adapter, you can connect the OptiPlex to a LAN right out of the box. If you plan to use this system as a corporate workstation, you may be able to dispense with some components such as the Altec Lansing ACS 90 speakers (use a pair of inexpensive headphones instead) and the 33.6-kbps U.S. Robotics telephony modem if your company already has a voice-mail system and a fax and e-mail server. Depending on your needs, you might even consider something smaller than the included 3.2GB hard drive.

This Pentium MMX-200–based PC ▶

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scored 226 on WorldBench, only a tad below average for its processor class. The 17-inch Dell D1728D-LS monitor delivers bright colors and clear, crisp graphics and text. But it isn't Dell's top 17-inch monitor. For an extra $100, you can move up to a 17HS Trinitron, which displays even sharper text and provides more on-screen controls. The 4MB Matrox Millennium graphics board and built-in 16-bit Vibra sound are fine for most office workstations. There's even a port for Universal Serial Bus peripherals, which should start appearing later this year.

Dell OptiPlex GXi 200M

The GXi 200M is intelligently designed and well put together. We easily removed the desktop case cover by hand-turning a screw. The expansion slots sit on a daughtercard above the motherboard; we found plugging cards into them as painless as it gets. We have only two beefs. With only one available external drive bay, one free 32-bit slot, and two 16-bit slots, the expansion options are a little restricted. You'll also find that the three available DIMM sockets are sequestered behind snaking cables, which can make them somewhat hard to reach.

Dell provides an abundance of ▶

TOP 20 POWER DESKTOPS

	SYSTEMS	CPU	RAM (MB)	Secondary cache (K)	PC WorldBench score
1	Dell Dimension XPS H266*	Pentium II-266	32	512	263
2	Dell Dimension XPS M200s*	Pentium MMX-200	32	512	234
3	Dell Dimension XPS Pro200n*	Pentium Pro-200	32	256	230
4	Dell OptiPlex GXi 200M*	Pentium MMX-200	32	512	226
5	Micron Millennia Pro2 200 B*	Pentium Pro-200	32	256	231
6	Gateway 2000 G6-266 M	Pentium II-266	32	512	263
7	Gateway 2000 G6-200	Pentium Pro-200	32	256	234
8	Dell OptiPlex GX Pro 200	Pentium II-266	32	512	230
9	Quantex QP6/266 SM-4	Pentium II-266	32	512	259
10	HP Vectra VA 6/200MT	Pentium Pro-200	32	256	229
11	HP Pavilion 7370V	Pentium MMX-200	32	256	222
12	Quantex QP6/200 SM-4	Pentium Pro-200	64	256	230
13	Sys Technology Sys Performance P200T2M	Pentium MMX-200	32	512	233
14	Netis N6200PCI	Pentium Pro-200	32	256	230
15	Sys Technology Performance Pro 200	Pentium Pro-200	32	256	236
16	Multiwave P-200 MMX	Pentium MMX-200	32	512	235
17	CLR Infinity P-200 MMX	Pentium MMX-200	32	512	229
18	Sys Technology Performance Pro 266	Pentium II-266	32	512	262
19	Acma zPower Pro-200	Pentium Pro-200	32	256	231
20	Polywell Poly K6200Mx	AMD K6-PR200	32	512	241

*Best Buy

PERFORMANCE

Word 7.0 for Windows 95
Excel 7.0 for Windows 95
Picture Publisher 6.0 for Windows 95
Paradox 5.0 for Windows
WordPerfect 6.1 for Windows
1-2-3 release 5 for Windows

HOW WE TEST All systems are tested with PC WorldBench, PC World's application-based benchmark. A higher PC WorldBench score is better. All PCs have Windows 95, and video resolution is set to 800 by 600 in 256 colors. We run automated scripts on six popular business applications, performing common tasks such as spelling checks, scrolls, saves, sorts, and recalculations. The PC WorldBench score is a sum of the weighted result of each script: Word (25 percent), Excel (20 percent), Picture Publisher (15 percent), Paradox (15 percent), WordPerfect (15 percent), and 1-2-3 (10 percent). For more details on our benchmark and how we run it, see PC World Online (www.pcworld.com/testing).

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Circle 170 on reader service card

support for the GXi 200M. The system's manual is nicely illustrated, easy to understand, and well organized; the on-screen documentation is helpful; and technical support is available around the clock. As with all its OptiPlex PCs, Dell backs the GXi 200M with a three-year warranty on parts and one year on labor. Our readers give high reliability ratings to Dell systems, and the company consistently scores in the top tier for service and support.

5 MICRON MILLENNIA PRO2 200 B

PRO: Very fast; has highly rated modem, second processor socket, good reliability rating

CON: Long waits for technical support

Micron's Millennia Pro2 200 B is a very strong choice in a corporate minitower, and at $2738—$221 down from June—it's very attractively priced. This Millennia is also our top pick among the systems we've tested to offer an upgrade path to a dual-processor system. The system's Intel motherboard includes a socket for adding another Pentium Pro-200 processor—an unusual and useful option that allows multiprocessing with an operating system that can take advantage of it, such as Windows NT.

The Millennia Pro2 comes with solid Pentium Pro performance and top-notch peripherals. Its PC WorldBench score of 231 puts it a bit above average for Pentium Pro-200 systems, and we found highly rated components in it, such as the U.S. Robotics Sportster 33.6-kbps internal modem and the Diamond Stealth 3D 2000 graphics board, both of which regularly place on the Top 10 charts. Micron also includes a large 3.1GB hard drive, a nice pair of Advent AV007 speakers, and an integrated sound chip. The software bundle is Microsoft Office.

Micron Millennia Pro2 200B

The Millennia's warranty covers the CPU and main RAM for five years and other parts for three. You also get free on-site service for the first year and 24-hour toll-free tech support. Though readers in our fax-back surveys have reported long hold times, they still give Micron very high marks for support quality and are usually pleased with system reliability.

New This Month

The following PCs made our Power Desktops chart for the first time this month. For original reviews of previously tested PCs on the chart, visit our Web page (www.pcworld.com/t20pcs).

6 GATEWAY 2000 G6-266 M

PRO: Fast as a rocket, great multimedia, 56-kbps modem, Zip drive, top support

CON: So-so reliability rating, haphazard manuals

Gateway 2000's new G6-266 M lacks nothing for the home office, and this Pentium II minitower ties with this month's Dell Pentium II entry as the fastest Top 20 PC ever tested, with a WorldBench score of 263. It has an unmatched multimedia and communications setup. It looks good, too, with beveled edges, a stylish curvilinear design, and a removable front panel that conceals all but the CD-ROM and floppy drives. The $3109 price is terrific for this PC—it includes Microsoft Office 97 Small Business Edition and several game and reference titles.

Gateway 2000 G6-266 M

Only Gateway's below-average record for system reliability should give you pause. Our latest fax-back survey suggests that the company's quality control could be better, and a couple of flags of our own went up during this review. The test system came with the wrong hard drive documentation, and the main manual, while well written and beautifully illustrated, covered several Gateway systems and failed to mention some of the latest features, such as the two USB ports.

Even with these concerns, there's much to recommend this machine. The multimedia setup is superb—it's among the best we've experienced on a PC. The wavetable-equipped sound card helped, but it's the speaker system that steals the show. Each of the external side speakers (a pair of Altec Lansing ACS 410 units) has, in addition to a half-inch dome tweeter, a pair of 3-inch bass speakers aimed forward and out to the sides, complemented by a 40-watt subwoofer (the ACS 251). Tchaikovsky's *1812 Overture* sounded impressive even in stereo mode, but when we switched to the Surround-Sound setting, the effect was divine.

Rounding out the multimedia setup is a very good graphics system and a 12X CD-ROM drive. The 17-inch monitor is exceptionally sharp and flicker-free. The 4MB Virge GX video card offers true-color images up to 1024 by 768 resolution.

Media files, such as .avi movie clips, can scarf up disk space quickly, but the G6-266 is uniquely prepared to deal with them. It comes with a huge 6.4GB hard disk and an Iomega Zip drive, which lets you move multimegabyte files to other Zip drive–equipped PCs using compact, removable 100MB disks.

The core of the G6-266's communications setup is its Telepath modem. Under the label, it's really a U.S. Robotics Sportster, one of the most enduring brands on our Top 10 Modems chart. This version is 56-kbps—the first we've seen in a Top 20 PC.

Respondents to our latest fax-back survey give high praise for Gateway 2000's technical support. The policies are very generous—a full three-year warranty, a year of free on-site service, and 24-hour phone support, weekends included.

8 DELL OPTIPLEX GX PRO 200

PRO: Very fast, easy to upgrade, built-in networking, DMI-compliant

CON: Multimedia is a little behind the times

This system, with an updated motherboard BIOS, replaces the GX Pro 200 we reviewed two months ago. It continues to offer top performance and above-average features, and you still get Dell's excellent service and support. Now the GX Pro 200 also has a reasonable $3246 price—over $1000 less than the unit we reviewed in May. It's a fine choice for IS managers looking to equip offices with high-powered network-ready PCs.

Dell GX Pro 200

And high-powered it is. With a PC WorldBench score of 230, its performance remains the same as it was in ▶

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May, keeping this Pentium Pro-200 desktop on a par with the average of systems based on this CPU. The GX Pro 200 also comes stocked with many highly rated peripherals, such as its U.S. Robotics Sportster 33.6-kbps modem and a Matrox Millennium graphics card. The software bundle includes Microsoft's Office 97 suite of business applications and Windows NT Workstation 4.0, in addition to Windows 95.

Not all the features are cutting edge. The 17-inch Dell 17LS monitor that came with our test system produced reasonably sharp images, but Dell's Trinitron model would have been more fitting. Corporate desktops tend to be a little behind the times on multimedia, and the GX Pro 200 is no exception: It comes with a pair of Altec Lansing speakers, but it lacks both wavetable audio and a MIDI port.

Nevertheless, the GX Pro 200 will satisfy system administrators. Particularly useful is Desktop Management Interface 2.0. Using compatible asset management software, IS managers can find out exactly how a given workstation on a LAN is configured, all from another terminal. The GX Pro's built-in 3Com Fast Ethernet network port is another nice addition.

Dell's technical support is excellent. Representatives are available around the clock, weekends included, and the system is backed by a three-year parts and one-year labor warranty. Our fax-back survey results suggest that Dell lives up to its support policies. Most respondents continue to praise the company for its service, and its PCs for their reliability.

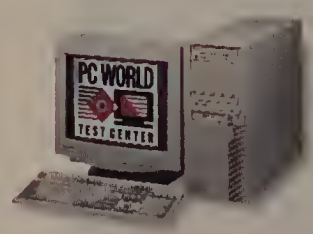
9 QUANTEX QP6/266 SM-4

PRO: Very low cost for a Pentium II, extremely fast

CON: Reliability rating is only fair

Quantex's QP6/266 SM-4 has the distinction of being the lowest-priced Pentium II system on our Power chart. At $2899, it undersells the next least expensive Pentium II we reviewed, Gateway's G6-266M, by $210. Yet you also get blazing speed and no shortage of features.

What keeps the QP6/266 from placing higher, however, is reliability. In our latest reader fax-back survey, Quantex has improved from poor to fair compared with other major PC vendors. This is a good trend, but a fair rating indicates that a number of readers are still experiencing trouble with their PCs. The minitower we received may reflect some of Quantex's problems. Our review unit's modem board was completely detached from its expansion slot, and the hard drive didn't work at first. We had to reseat the modem and spend time with Quantex support to get the drive up and running.



Quantex QP6/266 SM-4

The QP6/266 posted a PC WorldBench score of 259, a few points below the three other Pentium II machines tested, but still extremely fast. At that level, it's nearly impossible to distinguish any speed difference between the four systems as you work. The QP6's multimedia and graphics hardware is very good and should certainly satisfy most home-office users. The 12X CD-ROM drive is fast enough for nearly anyone. The Yamaha sound chip and Altec Lansing ACS 400 speakers and ACS 250 subwoofer delivered full, rich sound. The .25-dot-pitch MaxDX700T 17-inch monitor and 4MB Matrox Millennium II graphics board produced razor-sharp, true-color images. And the interior was very clean, with plenty of free, accessible slots and bays for adding peripherals.

Capping off the QP6's list of home-office assets is a generous software bundle that includes Corel WordPerfect Suite 7.0 and Intuit Quicken, plus a CPI ViVa CommCenter 33.6 modem. Microsoft's Phone, a phone/fax/data program, comes bundled with the modem; you can use it to take phone messages and send and receive faxes.

Microsoft Phone also comes with a module called Voice, which recognizes some spoken Windows commands and reads aloud any text you select, such as e-mail messages. Voice isn't ready for prime time yet, however. The several seconds it takes to interpret commands seems like eons compared to how quickly you can type or mouse them, and the program can make some disturbing errors—for example, it kept interpreting the command "Press Cancel" as "Cut Selection."

We were not impressed with the QP6/266's documentation. The user manual has lots of supporting photos and tries to be reader-friendly by covering many Windows 95 terms, but it's still too technical in places. However, you can call support anytime night or day, weekends included. Quantex backs its PCs with a three-year parts and one-year labor warranty, and our fax-back responses indicate general satisfaction with the company's support.

13 SYS TECHNOLOGY SYS PERFORMANCE P200T2M

PRO: Very fast, very good graphics system

CON: No user guide, no business applications

If you've just found out that "PC" stands for something besides "politically correct," you may want to think twice about buying this machine—its documentation consists only of a grab bag of component manuals, not enough to anchor the uninitiated. But if you're looking for a fast and affordable PC and don't require hand-holding to get it running, the $2657 multimedia- and modem-equipped Sys Performance P200T2M is a strong choice.

Few systems offer a better combination of speed and features at this price. This Pentium MMX-200 minitower blazed through PC WorldBench, earning a 233 score. Not only is it noticeably faster than the average desktop based on the same processor, it outpaces most Pentium Pro-200 PCs we've tested. The P200T2M is no scaled-down box, either. It comes with a sizable 3.2GB hard drive and a very good multimedia setup. The 12X Teac CD-512E drive garnered a Best Buy in our CD-ROM drive roundup (see "12X, 16X, 18X: The Fastest Drives Alive"). The wavetable-equipped Sound Blaster audio card and the pair of MIDI-land MLi-65 speakers, while a little shy on bass, still serve up very nice sound. A fast Diamond Stealth 3D 3000 video card and crisp 17-inch monitor neatly handle the graphical chores, delivering crisp, true-color images at up to 1024 by 768 resolution. Sys also includes a 33.6-kbps modem and ▶

Performance P200T2M

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COMit fax/data software. The PC comes with some game and reference titles (including Nascar Racing and Compton's Interactive Encyclopedia), but you'll have to pay extra for any productivity programs.

We were impressed by what we know about Sys Technology's support. While its one-year warranty is considered short these days, the company provides a year of on-site service, and its phone support is available 24 hours per day, weekends included. We don't have enough fax-back survey results to formally rate Sys's service or the reliability of its PCs, but the technicians we've spoken to in our anonymous calls to support have been easy to reach, knowledgeable, and courteous.

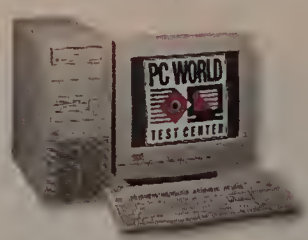
18 SYS TECHNOLOGY PERFORMANCE PRO 266

PRO: Superfast, big SCSI hard drive, Fast Ethernet card, good speakers

CON: Very pricey, poor manuals, no applications

The Performance Pro 266 is a PC for all reasons—and that's good and bad. It's good because, with its blow-your-doors-off speed, Fast Ethernet connectivity, SCSI hard drive, multimedia, and 33.6-kbps modem, the Performance Pro is an equally strong candidate for a server, a corporate PC, or (with the optional software bundle) a home-office system. And it's bad because all the extras drive up the PC's price to a steep $4369, with Windows 95 the only software included.

Sys Technology's minitower is based on the 266-MHz Pentium II processor—and it shows. With a terrific PC WorldBench score of 262, only the Dell and Gateway 2000 Pentium II machines are faster. Its 3Com Fast Ethernet card allows 100-mbps LAN connections, suiting this PC nicely for the corporate workstation scene. At the same time, home-office users will appreciate its built-in 33.6-kbps modem.



Performance Pro 266

Sys didn't pull out all the stops for multimedia, but it's not a bad setup. The 32-bit Sound Blaster audio card doesn't offer quite the level of fidelity that you get from wavetable-enhanced cards, but the 12X CD-ROM drive is plenty fast, and the large 4.3GB hard disk should accommodate your media file collection for some time. The MLi-65 speakers were the nicest surprise—they deliver crisp, pure tones even with the volume cranked up.

The Performance Pro 266 does have a few ergonomic blemishes, but it's generally pleasant to use. The Windows 95 keyboard feels a little cheap and flexy, and the key for rebooting the system is unlabeled (because it looks like a fat <Backspace> key, we found out its true purpose the hard way). Still, the keyboard is comfortable and quiet.

Polywell Poly K6200Mx

Documentation for the Performance Pro is pretty rough. It's a smattering of booklets—one for each peripheral and one for the system board (the latter something only an electrical engineer could love). But Sys's support policy is competitive: Parts and labor are covered for just a year, but that includes on-site service and round-the-clock technical support.

20 POLYWELL POLY K6200MX

PRO: Very fast, inexpensive, long warranty

CON: Poorly organized documentation, cheap-feeling keyboard

Polywell's Poly K6200Mx is the first review system we received that's based on AMD's K6 processor. This 200-MHz machine achieved a PC WorldBench score of 241, beating the fastest Pentium Pro-200 unit (Sys Technology's Sys Premier, reviewed in June) by a few WorldBench points. That makes it faster than all other systems we've covered, except for the four new Pentium II PCs in this month's roundup. It's clear that AMD's K6 processor is a powerful competitor to Intel's vaunted Pentium II chip.

Based only on the performance and features that you get for the price, the Poly K6200Mx is hard to beat. Though the manual's technobabble may leave some folks scratching their heads, this $2569 minitower is an excellent candidate for PC-savvy but budget-conscious shoppers seeking a very powerful home-office system.

The K6200Mx is well designed and comes with some excellent components. We had to undo a few screws to get into the dark-gray case, but once inside we found everything cleanly laid out. The giant 5.1GB Maxtor hard disk is particularly fast for an IDE model, according to benchmarks we ran in April ("Hard Disks for Bargain Hunters"). The Maxtor drive, plus the powerful 4MB Diamond Stealth 3D 2000 graphics card, makes the K6200Mx ideal for disk-intensive applications such as juggling huge database files and rasterizing complex high-resolution images.

The only thing you'll need for a complete multimedia setup is a pair of speakers—the system already has a 12X CD-ROM drive, a Crystal 16-bit sound board, and a Sampo 17-inch monitor. You can use the GVC 33.6-kbps modem, along with the bundled Super Voice 2.2 software, to set up the PC to answer and record phone calls as well as to send and receive faxes. Polywell also includes the Microsoft Office 97 suite of applications.

The K6200Mx has a few rough edges. For example, the keyboard has a cheap, jangly feel. And as we alluded to earlier, the documentation could easily frighten off novices. It consists of a bunch of peripherals manuals, plus a main system manual that could use better organization. The introduction barrages the reader with technical terms, while the more tutorial plain-language section is buried toward the back. Should you cry uncle, Polywell provides technical support 24 hours per day, seven days a week for the first year. The company covers the K6200Mx with a three-year warranty on parts and an unusually long five years on labor. ▶

Beyond the Top 20

We evaluated these systems along with the others, but they didn't score high enough to reach the Top 20 Power Desktops chart. For write-ups, see PC World Online (www.pcworld.com/t20pcsnaps).

- **Altura Pro-200**
- **CLR Infinity PT5-AX**
- **HP Vectra 6/200 MT**
- **NEC Ready 9716**
- **Nova P551420 MMX**
- **Toshiba Infinia 7201**

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[illegible]	[illegible]	1280 X 1024	DIGITAL ON SCREEN	$299
[illegible]	17" 15.8"	1024 X 768	DIGITAL	$379
17B+	17" 15.8"	1280 X 1024	DIGITAL ON SCREEN	$499

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PC WORLD

TOP 20 BUDGET DESKTOPS

	SYSTEMS	Last month	Month tested	Street price (4/15/97)	CPU	Comments
1	Dell Dimension XPS M166s 800/388-8542 www.dell.com	–	NEW	$2299	Pentium MMX-166	Speedy, very big hard drive, good graphics, top reliability rating.
2	Micron Millennia LXA P166 888/634-8799 www.micronpc.com	3	Jan 97	$1499	Pentium-166	$150 price drop moves fast PC up a notch; support is among the best.
3	Dell Dimension M200a 800/388-8542 www.dell.com	2	June 97	$2179	Pentium MMX-200	Quick, well-rounded, high reliability rating.
4	Dell OptiPlex GS+ 200L 800/388-8542 www.dell.com	5	June 97	$2018	Pentium-166	$80 price slide keeps this corporate compact in Best Buy ranks.
5	Micron Home MPC P200 888/634-8799 www.micronpc.com	–	Mar 97	$2448	Pentium-200	Good family software bundle; now $201 cheaper.
6	Quantex QP6/200 SM-1 800/896-4898 www.quantex.com	12	Aug 96	$1999	Pentium Pro-200	Loaded, fastest PC on chart for under $2000, great home machine.
7	IBM PC 350 (Pentium-166) 800/426-2968 www.pc.ibm.com	4	Dec 96	$1992	Pentium-166	IBM's PC reliability slips to fair, pulling this corporate PC from Best Buy ranks.
8	Gateway 2000 P5-166 800/846-2000 www.gw2K.com	7	Feb 97	$2099	Pentium-166	Includes large, very sharp monitor and fast modem; $100 price drop.
9	Gateway 2000 P5-200 800/846-2000 www.gw2K.com	–	June 97	$2499	Pentium MMX-200	$120 price cut puts former Power system on Budget chart. Fastest here.
10	HP Pavilion 5320 800/724-6631 www.hp.com	8	June 97	$1848	Pentium-150	On slow side but very reliable; comes with good software bundle.
11	HP Vectra VE 5/133 800/752-0900 www.hp.com	10	Dec 96	$1705	Pentium-133	Corporate PC's price drops $34; Unified Memory Architecture slows it down.
12	Midwest Micro MWH-200 800/728-8582 www.mwmicro.com	–	Feb 97	$2029	Pentium-200	Reliability rating improves to fair, price drops $70 to help move PC onto chart.
13	Kingdom 6x86 P166+ Super Value 800/385-3436 www.kingdomcomputers.com	9	May 97	$1297	Cx6x86-P166+	Least expensive PC here; comes with 16X CD-ROM drive but no modem.
14	CyberMax Cyrix Max C3 P166+ 800/443-9868 www.cybmax.com	11	Feb 97	$1499	Cx6x86-P166+	Fastest PC here under $1500, but support hours are relatively short.
15	Quantex QP5/200MMX SM-3 800/896-4898 www.quantex.com	20	Mar 97	$2349	Pentium MMX-200	Fast, loaded; reliability rating improves—but only to fair.
16	CyberMax Max I6/P200MMX 800/443-9868 www.cybmax.com	–	NEW	$2199	Pentium MMX-200	Very fast, but support hours are limited.
17	DirectWave MVP P-133 800/882-8108 www.directwave.com	13	Oct 96	$1549	Pentium-133	Well built, multimedia, fastest P-133 on chart; support hours limited.
18	Polywell Poly 500QX 800/999-1278 www.polywell.com	14	June 97	$1598	AMD K5-PR166	P-200-level speed for peanuts; little known of Polywell's service, reliability.
19	Vektron Home Office P133 800/725-0026 www.vektron.com	–	Mar 97	$1345	Pentium-133	$100 cut on very low-cost PC; a little slow; has limited support.
20	Tangent MediaGem 800/342-9388 www.tangent.com	–	Sept 96	$1895	Pentium-200	Fast P-200 has built-in speakers and video input; tech support hours are short.

Best Buy See features chart, page 226; performance chart, page 228. Recommended as home system

[1] To order fax copies of system reviews, call 800/434-4495 from a touch-tone phone and use your credit card. You can order next month's reviews in advance: Power Desktops, Budget Desktops, or Notebook PCs Top 20 charts and capsule reviews ($9.95, available June 25).

YOU CAN HAVE YOUR MMX AND SAVE MONEY, TOO. Two of our budget Best Buys, including the top-rated Dell Dimension XPS M166s, are based on Pentium MMX chips. AST's Advantage 9413, an MMX-200, missed the Top 20 because of poor reliability and service ratings, but it's the fastest budget desktop we've ever tested. Its WorldBench score of 236 falls only 5 points behind that of the new Polywell K6200Mx minitower that placed 20th on the Power Desktops chart, and puts the system ahead of most Pentium Pro-200s we've tested. To read about the Advantage and other PCs that didn't make the cut—seven of the nine are based on the MMX processor—visit PC World Online (www.pcworld.com/t20pcsnaps).

SCORECARD

★ Overall rating	Price	Vendor's system reliability	Features and design	PC WorldBench score/performance	Vendor's support quality/policies	Fax reprint number [1]	Reader service number
85	expensive	best	very good	223/very good	best/best	–	698
85	inexpensive	good	good	200/good	best/best	3473	699
85	expensive	best	very good	219/very good	best/best	3537	700
80	average	best	satisfactory	198/good	best/best	3538	701
80	expensive	good	very good	216/very good	best/best	3496	702
80	average	fair	very good	224/very good	good/best	3405	703
79	average	fair	outstanding	197/good	good/best	3468	–
79	average	fair	very good	199/good	best/best	3539	704
79	expensive	fair	very good	233/outstanding	best/best	3540	705
78	average	best	good	180/good	good/fair	3541	706
78	average	best	good	166/satisfactory	good/poor	3465	707
77	average	fair [2]	very good	210/very good	good [2]/fair	3542	708
77	inexpensive	[3]	good	197/good	[3]/good	3543	709
77	inexpensive	[3]	good	205/good	[3]/good	3544	710
76	expensive	fair	very good	221/very good	good/best	3497	711
76	expensive	[3]	very good	230/very good	[3]/good	–	712
76	inexpensive	[3]	very good	194/good	[3]/best	3439	713
75	average	[3]	good	213/very good	[3]/good	3545	714
75	inexpensive	[3]	good	188/good	[3]/fair	3504	715
75	average	[3]	very good	220/very good	[3]/fair	3423	716
Scorecard weightings ▶	Price 25 percent	Reliability 25 percent	Features 20 percent	Performance 15 percent	Support 15 percent	All products:	909

[2] Limited data; score is based on responses for this company and average of all companies. [3] Insufficient data.

This Month's Best Buys

1 DELL DIMENSION XPS M166S

PRO: Terrific speed, great reliability and support

CON: Relatively high price

If you're shopping for a home office system that gives you the most for your money, put the XPS M166s on your short list. It's superfast (its PC WorldBench score is 223), comes with a set of components that reads like a Who's Who of our Top 10 charts, and is backed by excellent support. No PC is without its weak points, but this has only one: a relatively high $2299 price.

Using a less expensive graphics board is one way that Dell could have cut the cost —the 15-inch monitor is too small to take full advantage of the ultrahigh resolutions possible with the 4MB Matrox Millennium graphics card. Even so, the XPS M166s is a superb deal. It comes with a spacious 4.3GB hard drive and a U.S. Robotics Sportster Voice modem, one of the more highly rated modems *PC World* has tested. The 33.6-kbps Sportster is voice-enabled, which means that if you use the included Vocal Point voice/fax/data software, your computer can double as an answering machine.

Dell Dimension XPS M166s

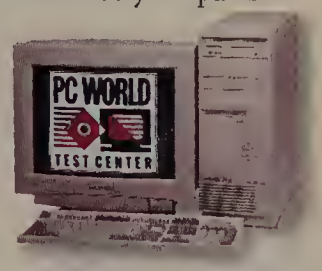
Its software bundle makes this PC a nice choice for a small business or home office. Besides the Vocal Point communications package, Dell includes Microsoft Office Small Business Edition, which lacks the PowerPoint presentation program but has Publish 97, Small Business Financial Manager, and Automap Streets. Dell's Dimension PCs are backed by a three-year warranty on parts and one year of free labor, and toll-free support is available 24 hours a day. The company continues to earn top marks for service and reliability in our reader fax-back surveys.

2 MICRON MILLENNIA LXA P166

PRO: Alluring price, well built

CON: None significant

The $1499 LXA P166, $150 less than it cost last month, is a bargain corporate computer. This Pentium-166 is faster than the average for its CPU class. The included Diamond Stealth 3D 2000 video card brims with a hefty 4MB of EDO DRAM, and multimedia is good, including a fast 12X CD-ROM drive and a pair of Advent AV2706 speakers. Besides 24-hour-a-day technical support, Micron offers a three-year parts and one-year labor warranty, plus a year of free on-site service. Readers have been reporting long hold times for support, but once through they get great help. They are also satisfied with the reliability of Micron computers. ▶



Micron Millennia LXA P166

TOP 20 BUDGET DESKTOPS — STANDARD FEATURES

	SYSTEMS	CPU	RAM (MB)	Secondary cache (K)	Hard drive (GB)	Graphics adapter	Video RAM (MB/type)	Monitor tube/ viewable diagonal (inches)	Screen pitch (mm)	CD-ROM drive speed
1	Dell Dimension XPS M166s*	Pentium MMX-166	32	512	4.3	Matrox Millennium	4/WRAM	15/13.8	.28	12X
2	Micron Millennia LXA P166*	Pentium-166	16	512	2.1	Diamond Stealth 3D 2000	4/EDO DRAM	15/13.5	.28	12X
3	Dell Dimension M200a*	Pentium MMX-200	16	256	2.1	integrated S3	2/DRAM	15/13.6	.28	12X
4	Dell OptiPlex GS+ 200L*	Pentium-166	32	256	2.1	integrated	2/VRAM	15/14	.28	8X
5	Micron Home MPC P200*	Pentium-200	32	512	3.1	Diamond Stealth 3D/Monster 3D	4/EDO DRAM	17/16	.26	12X
6	Quantex QP6/200 SM-1	Pentium Pro-200	32	256	2.5	STB Lightspeed 12B	2/MDRAM	17/16	.26	12X
7	IBM PC 350 (Pentium-166)	Pentium-166	16	256	1.3	integrated S3 Trio64V+	2/EDO DRAM	15/13.7	.28	6X
8	Gateway 2000 P5-166	Pentium-166	16	256	2.5	ATI Rage 3D	2/SGRAM	17/15.9	.25	12X
9	Gateway 2000 P5-200	Pentium MMX-200	32	512	3.8	S3 Virge 3D	4/VRAM	17/15.9	.28	12X
10	HP Pavilion 5320	Pentium-150	16	256	1.6	integrated	2/EDO DRAM	15/13.8	.28	8X
11	HP Vectra VE 5/133	Pentium-133	16	256	1.1	integrated SiS 6205	2/EDO DRAM	15/14	.28	8X
12	Midwest Micro MWH-200	Pentium-200	16	512	3.2	STB Lightspeed 12B	2/MDRAM	15/13.8	.28	12X
13	Kingdom 6x86 P166+ Super Value	Cx6xB6-P166+	16	256	2.1	PCI-60V	2/EDO DRAM	15/13.8	.28	16X
14	CyberMax Cyrix Max C3 P166+	Cx6xB6-P166+	24 [3]	512	2.1	STB Lightspeed 12B	4/MDRAM	15/13.8	.28	12X
15	Quantex QP5/200MMX SM-3	Pentium MMX-200	32	512	3.2	Matrox Mystique	4/SGRAM	17/16.1	.28	12X
16	CyberMax Max I6/P200MMX	Pentium MMX-200	32	512	4.3	Diamond Stealth 3D 2000	4/EDO DRAM	17/15.7	.26	12X
17	DirectWave MVP P-133	Pentium-133	16	512	1.6	Diamond Stealth 3D 2000	4/EDO DRAM	17/14.3	.28	8X
18	Polywell Poly 500QX	AMD K5-PR166	32	512	2.5	Diamond Stealth 3D 2000	2/EDO RAM	15/13.8	.28	12X
19	Vektron Home Office P133	Pentium-133	16	256	2.5	Matrox Mystique	2/SGRAM	15/14.1	.26	16X
20	Tangent MediaGem	Pentium-200	32	512	2.1	STB Lightspeed 12B	2/MDRAM	17/15.6	.28	8X

* Best Buy [1] Five years on CPU and main RAM, three years on other parts. [2] Toll call. [3] Tested with 24MB of RAM; now sold with 32MB.

3 DELL DIMENSION M200A

PRO: Excellent service and support

CON: Slow for an MMX-200, monitor a little dull

With a PC WorldBench score of 219, this MMX-200 minitower is only slightly faster than the average MMX-166 system. But at $2179, this lively home computer costs $400 less than the average for its processor class and comes with an appealing set of components: a roomy 2.1GB hard drive, a 12X CD-ROM drive, a 33.6-kbps voice modem with Vocal Point phone/fax/data software, and Microsoft Office Small Business Edition. Unfortunately, the 15-inch LS monitor that came with our test unit is not Dell's best; the picture lacks sharpness.

Dell Dimension M200a

The M200a is easy to upgrade, and its interior is clean. Dell's documentation continues to be a model to follow, complete with charts, illustrations, index, and glossary. If the troubleshooting guide can't help, Dell provides 24-hour-a-day toll-free phone support that readers rate very highly in our ongoing fax-back survey.

4 DELL OPTIPLEX GS+ 200L

PRO: Built-in networking; great service, reliability

CON: Thin feature set, limited expandability

This slim $2018 compact desktop, down $80 from June, is the entry-level system in Dell's network-ready corporate PC line. The OptiPlex GS+ 200L is a good choice for the business buyer looking for a low-cost machine that offers a space-saving design and built-in ethernet connectivity.

Dell OptiPlex GS+ 200L

This P-166's PC WorldBench score of 198 is a little low these days, and most of its components are quickly becoming entry-level. But the 15-inch Dell monitor has as clear a display as you'll find in that size, and extras include a good pair of Altec Lansing speakers and Microsoft Office Professional.

Dell continues to get the highest ranking for reliability and support in our fax-back surveys, and offers top-notch policies, including round-the-clock support.

		EXPANDABILITY						CUSTOMER SUPPORT			
Modem speed (kbps)	Sound board	Case style	Max. RAM (MB)	Maximum secondary cache (K)	Open RAM sockets	Open drive bays (ext./int.)	Open slots	Warranty for parts/labor (years)	Weekday toll-free support (hours)	Weekend support	Online support
33.6	Sound Blaster 16	minitower	64	512	1	3/1	4	3/1	24	Sat., Sun.	BBS, CIS, WWW
–	integrated	minitower	128	512	2	3/1	6	3 1/1	24	Sat., Sun.	CIS, WWW
33.6	Sound Blaster 16	minitower	64	512	1	3/1	6	3/1	24	Sat., Sun.	BBS, CIS, WWW
–	Sound Blaster 16	compact	128	256	2	0/0	2	3/1	24	Sat., Sun.	BBS, CIS, WWW
33.6	Sound Blaster AWE32	minitower	128	512	2	3/1	3	3 1/1	24	Sat., Sun.	CIS, WWW
33.6	Ensoniq Soundscape Vivo 90	minitower	128	256	0	2/1	3	3/1	24	Sat., Sun.	BBS, WWW
–	–	desktop	192	512	4	1/1	4	3/3	24	Sat., Sun.	AOL, BBS, CIS, WWW
33.6	integrated	minitower	128	512	1	2/2	5	3/3	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW
33.6	Ensoniq Soundscape Vivo 90	minitower	64	512	1	3/2	3	3/3	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW
33.6	integrated	desktop	128	256	2	1/0	3	1/1	24 [2]	Sat., Sun.	AOL, BBS, CIS, WWW
–	Sound Blaster 16 PnP	desktop	192	256	4	1/1	3	3/3	11 [2]	–	AOL, BBS, CIS, WWW
33.6	Sound Blaster AWE64 PnP	minitower	128	512	4	3/2	3	3/3	12	Sat.	BBS, WWW
–	ESS ES1868	tower	128	512	3	3/3	5	3/1	13	Sat.	WWW
33.6	Ensoniq Soundscape Vivo 90	minitower	128	512	0	3/2	4	3/1	12	Sat.	BBS, WWW
33.6	Ensoniq Soundscape Vivo 90	minitower	128	512	2	2/1	4	3/1	24	Sat., Sun.	BBS, WWW
33.6	Ensoniq Soundscape Vivo 90	minitower	128	512	2	2/2	3	3/1	12	Sat.	BBS, WWW
33.6	Sound Blaster AWE32	minitower	256	512	2	3/0	3	3/3	11	Sat.	BBS, WWW
33.6	Supersound Origins 3D	minitower	128	512	4	3/0	4	3/5	11	Sat.	BBS, WWW
33.6	Sound Blaster 16	minitower	128	256	2	3/0	3	1/1	11	Sat.	BBS, CIS, WWW
–	Sound Blaster 32 PnP	desktop	512	512	6	1/1	6	3/3	10.5	–	BBS, WWW

5 MICRON HOME MPC P200

PRO: Fast, large 3.1GB hard drive, 33.6-kbps modem, big software bundle, excellent service

CON: Expensive for a budget home PC

The system doesn't look like a lot of today's funky, contoured home PCs. But Micron's Home MPC P200 has the goods it takes to light up a home office or family fun center.

All the cool extras add up—$2448 is a lot for budget-conscious families to shell out. This system didn't even qualify for our Budget chart until its $201 price drop this month. But the Home MPC P200 includes a roomy 3.1GB Western Digital drive, and the fast 33.6-kbps Supra fax-modem comes with speakerphone support. Gamers will appreciate the new 4MB Diamond Monster 3D add-in card and subwoofer-equipped speaker system, which generates realistic 3-D graphics and sounds, as well as the Microsoft Gamepad for enjoying bundled software like Monster Truck Madness and Mech Warrior 2. Micron also includes Microsoft Office and Quicken, plus some kids games. This Pentium-200 minitower is fast as well as full-featured. Its WorldBench score of 216 puts it a few points ahead of the average system for its processor class.

Micron Home MPC P200

Micron backs its home PC with an extensive three-year warranty, and gets a good rating for PC reliability and high praise for support quality.

New This Month

The following PC made our Budget Desktops chart for the first time this month. For original reviews of previously tested PCs on the chart, visit our Web page (www.pcworld.com/t20pcs).

16 CYBERMAX MAX 16/P200MMX

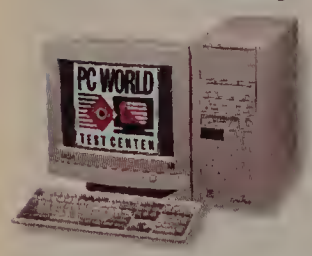
PRO: Fast, great features, big software bundle

CON: Expensive, manual could be more readable

The $2199 CyberMax 16/P200MMX is a good home PC candidate and one of the few systems we've reviewed with an Easy Photo drive for scanning snapshots. However, CyberMax's support hours are more suited to business than home users—12 hours a day, with none on Sundays.

This machine is one of the fastest on the Budget Desktops chart. You get a long ▶

list of name-brand peripherals, including a 4MB Diamond Stealth graphics card, Altec Lansing speakers and subwoofer, and an Ensoniq Soundscape wavetable-equipped sound board. The system's compact speakers have punch—the sound is so crisp it's almost harsh. CPI's Viva CommCenter 33.6-kbps phone/fax/data modem, with Microsoft Phone software, also comes in the box. You won't need to worry about running out of disk space—the 4.3GB hard drive will satisfy most users. CyberMax backs its systems with a typical three-year parts, one-year labor warranty and a year of on-site service. ▶



CyberMax I6/P200MMX

Beyond the Top 20

We evaluated these systems along with the others, but they didn't score high enough to reach the Top 20 Budget Desktops chart. For write-ups, see PC World Online (www.pcworld.com/t20pcsnaps).

- AST Advantage 9413
- CLR Infinity PD5-LX
- DTK Quin 55m/p P-166
- DTK Quin 57M/PM 200
- Kingdom Pentium MMX 200 Home & Office
- Micro Express Micro Flex-MMX/2000
- Monorail PC Model 133
- Nexar MMX P-200
- Premio Apollo Pro 200

TOP 20 BUDGET DESKTOPS

	SYSTEMS	CPU	RAM (MB)	Secondary cache (K)	PC WorldBench score
1	Dell Dimension XPS M166s*	Pentium MMX-166	32	512	223
2	Micron Millennia LXA P166*	Pentium-166	16	512	200
3	Dell Dimension M200a*	Pentium MMX-200	16	256	219
4	Dell OptiPlex GS+ 200L*	Pentium-166	32	256	198
5	Micron Home MPC P200*	Pentium-200	32	512	216
6	Quantex QP6/200 SM-1	Pentium Pro-200	32	256	224
7	IBM PC 350 (Pentium-166)	Pentium-166	16	256	197
8	Gateway 2000 P5-166	Pentium-166	16	256	199
9	Gateway 2000 P5-200	Pentium MMX-200	32	512	233
10	HP Pavilion 5320	Pentium-150	16	256	180
11	HP Vectra VE 5/133	Pentium-133	16	256	166
12	Midwest Micro MWH-200	Pentium-200	16	512	210
13	Kingdom 6x86 P166+ Super Value	Cx6x86-P166+	16	256	197
14	CyberMax Cyrix Max C3 P166+	Cx6x86-P166+	24	512	205
15	Quantex QP5/200MMX SM-3	Pentium MMX-200	32	512	221
16	CyberMax Max I6/P200MMX	Pentium MMX-200	32	512	230
17	DirectWave MVP P-133	Pentium-133	16	512	194
18	Polywell Poly 500QX	AMD K5-PR166	32	512	213
19	Vektron Home Office P133	Pentium-133	16	256	188
20	Tangent MediaGem	Pentium-200	32	512	220

PERFORMANCE

*Best Buy

Word 7.0 for Windows 95 · Picture Publisher 6.0 for Windows 95 · WordPerfect 6.1 for Windows · Excel 7.0 for Windows 95 · Paradox 5.0 for Windows · 1-2-3 release 5 for Windows

HOW WE TEST All systems are tested with PC WorldBench, PC World's application-based benchmark. A higher PC WorldBench score is better. All PCs have Windows 95, and video resolution is set to 800 by 600 in 256 colors. We run automated scripts on six popular business applications, performing common tasks such as spelling checks, scrolls, saves, sorts, and recalculations. The PC WorldBench score is a sum of the weighted result of each script: Word (25 percent), Excel (20 percent), Picture Publisher (15 percent), Paradox (15 percent), WordPerfect (15 percent), and 1-2-3 (10 percent). For more details on our benchmark and how we run it, see PC World Online (www.pcworld.com/testing).

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MT-9017E

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Model/ Viewable Area	Dot Pitch Horiz. Scan	Max. Horiz. Scan Rate	Refresh Rate	ESP
21" MT-9021E (19.5" vis)	.30mm Aperture Grille	94 kHz	76 Hz (1600 x 1200)	$1,519
17" MT-9017E (16" vis)	.25mm Aperture Grille	92 kHz	72 Hz (1600 x 1200)	$649

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PC WORLD

TOP 20 NOTEBOOK PCs

	POWER NOTEBOOKS	Last month	Month tested	Street price (4/15/97)	CPU [1]	Comments
1	Dell Latitude LM M166ST 800/388-8542 www.dell.com	1	June 97	$3999	Pentium MMX-166	Fastest on chart, long battery life, big hard drive; one-year parts warranty.
2	Dell Latitude XPi P133ST 800/388-8542 www.dell.com	2	Aug 96	$2799	Pentium-133	$200 price cut; very good battery life and trackball but no CD-ROM drive.
3	WinBook LM 800/965-9349 www.winbookcorp.com/	3	May 97	$3199	Pentium-133	Fast, long battery life; keyboard could be better.
4	Transmonde Vibrant 133T 888/988-2882 www.transmonde.com	4	June 97	$2999	Pentium-133	Speedy, terrific battery life, interesting design; support policies limited.
5	WinBook FX 800/965-9349 www.winbookcorp.com/	6	May 97	$3599	Pentium-133	Sturdy, with comfortable keyboard and large hard drive.
6	Gateway 2000 Solo 2100 S5-150 800/846-2000 www.gw2K.com	9	Apr 97	$3749	Pentium MMX-150	Quick, loaded Pentium MMX, but weighs almost 9 pounds.
7	HP OmniBook 800CT 800/322-4772 www.hp.com/go/omnibook	7	Mar 97	$3240	Pentium-133	Very small and light, decent speed and battery life; no CD-ROM or modem.
8	Dell Latitude XPi CD M166ST 800/388-8542 www.dell.com	–	NEW	$4818	Pentium MMX-166	Very fast, has an excellent keyboard; pricey, on the hefty side.
9	Compaq Presario 1080 800/652-6672 www.compaq.com	10	June 97	$4499	Pentium MMX-166	Sleek, audiophiles will like it; heavy, expensive, 90 days on-site service.
10	ARM TS96CD-133T 408/935-9800 www.armcomputer.com	–	Feb 97	$2799	Pentium-133	Inexpensive for a power notebook, and fast, but support policies are limited.
	BUDGET NOTEBOOKS					
1	Compaq Armada 1130T 800/652-6672 www.compaq.com	3	Apr 97	$1399	Pentium-120	Very steep $600 cut makes this the most affordable active-matrix notebook.
2	HP OmniBook 5500CS 800/322-4772 www.hp.com/go/omnibook	1	Jan 97	$1620	Pentium-100	Low cost for a good all-around notebook; CD-ROM drive is $375 extra.
3	WinBook XP5 Pro P150 800/965-9349 www.winbookcorp.com/	6	June 97	$2599	Pentium-150	Fastest on budget chart, comes with vivid screen, modem, CD-ROM drive.
4	Hitachi E133T/1000 800/555-6820 www.hitachipc.com	–	June 97	$1999	Pentium-133	Big $400 drop, comes with nice screen and modem; no CD-ROM drive.
5	CTX EzBook 720CS 800/888-9052 www.ctxintl.com	8	May 97	$1499	Pentium-120	$200 price drop, comes with game pad and headphones.
6	Toshiba Satellite Pro 430CDS 800/457-7777 www.computers.toshiba.com	–	NEW	$1999	Pentium-120	On portly side, but has an excellent keyboard, fast CD-ROM drive.
7	Gateway 2000 Solo 2100 S5-120 800/846-2000 www.gw2K.com	9	Jan 97	$2099	Pentium-120	$200 drop, second-fastest on budget chart; lackluster battery life.
8	AcerNote Light 382 800/733-2237 www.acer.com/aac/	–	NEW	$1999	Pentium-150	Fast, best battery life on the chart; case feels a bit flimsy.
9	Mega Image Megabook 880 800/250-1876 www.megai.com	10	Feb 97	$1549	Pentium-100	$100 price drop, very affordable, but slower than a P-75.
10	Toshiba Satellite 200CDS 800/457-7777 www.computers.toshiba.com	–	NEW	$1599	Pentium-100	Low-cost entry-level corporate notebook, comes with 24-hour support; slow.

Best Buy See features chart, page 234; performance chart, page 238.

[1] Includes computer, adapter, power cord, floppy drive, and CD-ROM drive if notebook has one. [2] To order fax copies of system reviews, call 800/434-4495 from a touch-tone phone and use your credit card. You can order next month's reviews in advance: Power Desktops, Budget Desktops, or Notebook PCs Top 20 charts and capsule reviews ($9.95, available June 25).

Notebooks are getting ever better at multimedia. Most of the Top 20 notebooks this month come with sound, speakers, and 6X or faster CD-ROM drives, and four systems on the Power chart sport Pentium MMX processors. Of the new machines that didn't make the chart, Digital's HiNote VP 575 came the closest, but its appealing feature set, terrific WorldBench score of 209, and 6.5-hour battery life were overshadowed by meager support policies and a $4499 price. For reviews of the HiNote and other portables, visit PC World Online (www.pcworld.com/t20pcsnaps).

SCORECARD

★ Overall rating	PC WorldBench score/ rating	Price	Vendor's system reliability	Features and design	Vendor's support quality/policies	Battery life (hours:min)/ rating	Traveling weight [1]	Fax reprint number [2]	Reader service number
84	212/outstanding	average	average	very good	average/fair	5:52/very good	heavy	3834	717
84	166/good	very inexpensive	average	good	average/good	5:20/very good	average	3771	718
83	182/good	inexpensive	average	very good	average/fair	5:46/very good	heavy	3831	719
83	190/very good	inexpensive	average	outstanding	below average/poor	6:19/outstanding	very heavy	3835	720
82	188/very good	average	average	very good	average/fair	4:15/good	heavy	3832	721
82	199/very good	average	average	outstanding	below average/fair	3:12/good	heavy	3815	722
81	168/good	inexpensive	average [3]	good	[4]/poor	4:07/good	light	3811	723
81	199/very good	very expensive	average	outstanding	average/good	4:35/good	heavy	–	724
80	197/very good	expensive	average	very good	above average/fair	5:02/very good	heavy	3836	725
80	183/good	very inexpensive	[4]	good	[4]/poor	3:43/good	heavy	3837	726
Power scorecard weightings ▶	Performance 22 percent	Price 14 percent	Reliability 22 percent	Features 16 percent	Support 10 percent	Battery life 8 percent	Weight 8 percent		
84	140/good	very inexpensive	average	good	above average/fair	3:57/good	average	3820	727
82	152/very good	inexpensive	average [3]	good	[4]/poor	4:00/good	average	3807	728
78	183/outstanding	expensive	average	very good	average/fair	3:24/good	average	3838	729
78	126/good	average	[4]	good	[4]/good	3:55/good	average	3839	730
78	167/very good	inexpensive	[4]	satisfactory	[4]/poor	4:28/good	heavy	3833	731
78	141/good	average	average	good	below average/fair	4:10/good	heavy	–	732
77	171/very good	average	average	good	below average/fair	2:15/satisfactory	average	3805	733
77	170/very good	average	below average	good	[4]/fair	6:45/outstanding	average	–	734
77	87/poor	inexpensive	[4]	satisfactory	[4]/fair	2:47/satisfactory	average	3840	735
76	91/satisfactory	inexpensive	average	satisfactory	below average/fair	3:51/good	heavy	–	736
Budget scorecard weightings ▶	Performance 14 percent	Price 22 percent	Reliability 22 percent	Features 16 percent	Support 10 percent	Battery life 8 percent	Weight 8 percent	All products:	910

[3] Limited data; score is based on responses for this company and average of all companies. [4] Insufficient data.

POWER NOTEBOOKS

This Month's Best Buys

1 DELL LATITUDE LM M166ST

PRO: Blazing speed, big bright screen

CON: Heavy, no modem

The Latitude LM M166ST is aimed at business users looking for a notebook that has a lot of the performance and features they find in their desktops. Packing a Pentium MMX-166 chip and a whopping 40MB of RAM, this powerful portable earned a PC WorldBench score of 212—faster than some of the desktop MMX-166 systems we've tested. The price for all this power is a reasonable $3999, which includes a big software bundle: Microsoft Office Small Business Edition; the LapLink file transfer and remote control utility; and Sidekick 95, a personal information manager.

Dell Latitude LM M166ST

Seasoned travelers may balk at the Latitude's hefty 9.2 pounds, which in- ▶

TOP 20 NOTEBOOK PCs — STANDARD FEATURES

	POWER NOTEBOOKS	CPU	Traveling weight (pounds)[1]	RAM (MB)	Hard drive (MB)	Color screen type	Screen diagonal (inches)	Screen resolution	Maximum screen colors	Battery type	Pointing device
1	Dell Latitude LM M166ST*	Pentium MMX-166	9.2	40	2160	active	12.1	800 x 600	65,536	lithium ion	touchpad
2	Dell Latitude XPi P133ST*	Pentium-133	7.2	24	1215	active	11.3	800 x 600	256	lithium ion	trackball
3	WinBook LM	Pentium-133	8.6	16	1083	active	12.1	800 x 600	65,536	lithium ion	touchpad
4	Transmonde Vibrant 133T	Pentium-133	10.4	32	1440	active	12.1	800 x 600	65,536	NiMH	touchpad
5	WinBook FX	Pentium-133	9.4	32	2167	active	12.1	800 x 600	65,536	lithium ion	eraserhead
6	Gateway 2000 Solo 2100 S5-150	Pentium MMX-150	8.8	40	1300	active	12.1	800 x 600	65,536	lithium ion	touchpad
7	HP OmniBook 800CT	Pentium-133	6.6	16	1440	active	10.4	800 x 600	256	lithium ion	mouse
8	Dell Latitude XPi CD M166ST	Pentium MMX-166	9	32	2160	active	12.1	800 x 600	65,536	lithium ion	trackball
9	Compaq Presario 1080	Pentium MMX-166	8.8	16	1440	active	12.1	800 x 600	65,536	lithium ion	touchpad
10	ARM TS96CD-133T	Pentium-133	8.8	16	1358	active	12.1	800 x 600	65,536	lithium ion	touchpad
	BUDGET NOTEBOOKS										
1	Compaq Armada 1130T*	Pentium-120	7.5	16	1080	active	10.4	800 x 600	256	NiMH	trackball
2	HP OmniBook 5500CS*	Pentium-100	8	16	1358	dual-scan	11.3	800 x 600	65,536	lithium ion	eraserhead
3	WinBook XP5 Pro P150	Pentium-150	8.4	16	1083	active	11.3	800 x 600	256	lithium ion	eraserhead
4	Hitachi E133T/1000	Pentium-133	7.6	16	1083	active	11.3	800 x 600	256	NiMH	touchpad
5	CTX EzBook 720CS	Pentium-120	9.8	16	1084	dual-scan	12.1	800 x 600	65,536	NiMH	touchpad
6	Toshiba Satellite Pro 430CDS	Pentium-120	8.8	16	1358	dual-scan	11.3	800 x 600	65,536	lithium ion	eraserhead
7	Gateway 2000 Solo 2100 S5-120	Pentium-120	8.2	16	810	dual-scan	11.3	800 x 600	256	NiMH	touchpad
8	AcerNote Light 382	Pentium-150	8.4	16	1400	dual-scan	11.3	800 x 600	256	NiMH	touchpad
9	Mega Image Megabook 880	Pentium-100	7.6	16	1358	active	10.3	800 x 600	65,536	NiMH	trackball
10	Toshiba Satellite 200CDS	Pentium-100	9.2	8	772	dual-scan	11.3	800 x 600	65,536	NiMH	eraserhead

*Best Buy ● Yes ○ No [1] Includes computer, adapter, power cord, floppy drive, and CD-ROM drive if notebook has one. [2] Toll call.

cludes an AC adapter and a removable 10X CD-ROM drive. But its battery life is good—in our tests, the lithium ion pack lasted nearly 6 hours. The keyboard is comfortable and quiet, and moving the pointer on the screen with the touchpad is hassle-free. Text is sharp and graphics are brilliant on the 12.1-inch active-matrix screen. The built-in stereo speakers provide adequate sound.

Dell's documentation is superb, but support policies are only fair: Although the company offers nonstop phone support, it covers its Latitude LM systems for only one year. Readers responding to our monthly fax-back survey give Dell average marks for service and system reliability.

2 DELL LATITUDE XPI P133ST

PRO: Very inexpensive, excellent battery life

CON: No internal CD-ROM drive option, small hard drive, no modem

If you don't need a CD-ROM drive in your power notebook, then the $2799 Dell Latitude XPi P133ST—down $200 from last month—is your best choice. It's slower than the Latitude LM M166ST, its top-ranking speedster sibling, but its PC WorldBench score of 166 is better than average for a Pentium-133. The XPi's 5.3-hour battery life is very good—though a little shorter than that of the LM—and at 7.2 pounds, it weighs 2 pounds less. If you're planning to load a lot of programs and files on your PC, however, get a larger hard drive than the supplied 1.2GB unit. A modem costs extra.

The crisp 11.3-inch active-matrix screen has a maximum 800 by 600 resolution, typical of today's power notebooks. Bundled software includes the LapLink file transfer and remote control program, and Sidekick 95, a personal information manager.

Dell gets an average rating for both service and notebook reliability.

Dell Latitude XPi P133ST

		EXPANDABILITY					CUSTOMER SUPPORT			
CD-ROM drive speed	Modem speed (kbps)	Maximum RAM (MB)	Modular expansion bays	Bay for second battery	Optional docking station	Infrared port	Warranty for parts/labor (years)	Weekday toll-free support (hours)	Weekend support	Online support
10X	–	72	1	●	○	●	1/1	24	Sat., Sun.	AOL, BBS, CIS, WWW
–	–	40	0	○	●	●	3/1	24	Sat., Sun.	AOL, BBS, CIS, WWW
6X	28.8	40	1	●	●	●	1/1	13	Sat.	BBS, WWW
6X	33.6	64	1	○	○	●	1/1	11	–	WWW
8X	33.6	40	1	●	●	●	1/1	13	Sat.	BBS, WWW
8X	33.6	40	1	●	●	●	1/1	24	Sat., Sun.	BBS, WWW
–	–	48	0	○	●	●	3/3	12	–	AOL, BBS, CIS, WWW
10X	33.6	80	0	○	○	●	3/1	24	Sat., Sun.	AOL, BBS, CIS, WWW
10X	33.6	48	0	○	○	○	1/1	24	Sat., Sun.	AOL, BBS, CIS, WWW
10X	–	40	1	●	●	●	1/3	10.5	Sat.	AOL, BBS, WWW
–	–	48	0	○	○	○	1/1	24	Sat., Sun.	AOL, BBS, CIS, WWW
–	–	64	1	●	●	●	3/3	12	–	AOL, BBS, CIS, WWW
8X	28.8	40	1	●	●	●	1/1	13	Sat.	BBS, WWW
–	28.8	40	1	●	●	●	1/1	24	Sat., Sun.	BBS, WWW
6X	–	72	2	●	●	●	1/1	10	–	WWW
10X	–	48	1	○	●	●	1/1	24	Sat., Sun.	BBS, CIS, WWW
8X	–	40	1	●	●	●	1/1	24	Sat., Sun.	BBS, WWW
10X	–	64	0	○	○	○	1/1	24	Sat., Sun.	AOL, BBS, CIS, WWW
–	–	40	0	○	●	●	1/1	24	Sat.	BBS, WWW
6X	–	40	1	○	●	●	1/1	24	Sat., Sun.	BBS, CIS, WWW

New This Month

The following PC made our Power Notebooks chart for the first time this month. For original reviews of previously tested PCs on the chart, visit our Web page (www.pcworld.com/t20pcs).

8 DELL LATITUDE XPI CD M166 ST

PRO: Very fast, great keyboard and pointing device, internal CD-ROM and floppy drives

CON: Expensive, bulky

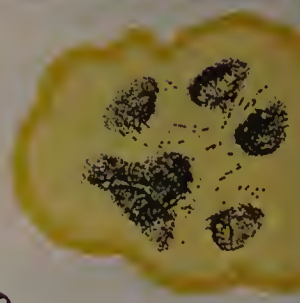
Dell's new top-of-the-line Latitude XPi CD M166 ST is one of the best desktop replacements we've seen. At 9 pounds, this Pentium MMX-166 multimedia notebook may seem too heavy and bulky to some frequent travelers, while others will be put off by its $4818 price. But this Latitude is very fast, outperforming most Pentium-166 desktops we've tested, and it's one of only a few portables that contain both internal CD-ROM and floppy drives. The 2GB hard disk is about as big as they come in notebooks. And in our standard rundown test, the battery lasted more than 4.5 hours.

Dell XPi CD M166ST

The machine's ergonomics are excellent. We rarely come across such an easy-to-use keyboard and pointing device. Despite their light touch, the keys provide a reassuring click, and the pointing device made us wonder why trackballs are losing ground to trackpads and mini–stick pointers.

We do have a couple of beefs about this Latitude XPi, besides its heft and high price. It comes with excellent documentation, both printed and on-screen, but the latter is a little out-of-date; it assumes, for example, that this model uses a Pentium-150 processor. Also, you'd think that for the price Dell could throw in business-oriented software such as Microsoft Office or Lotus SmartSuite. Instead, the bundle includes CyberJack 7.0 (a suite of Internet tools), and Microsoft BookShelf 95, but no productivity applications. ▶

Christian Murphy was non-verbal. He lived with a wall between himself and the world.



1 THIS IS CHRISTIAN.

He can see, hear, feel, touch, but he cannot speak. He was born with autistic tendencies that cut him off from the world around him.

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2 A TEACHER DISCOVERED *that Christian would respond to images from his life. She put visual cues to the story of his new puppy on a special keyboard.*

NEC MultiSync Monitors
E and A Series

3 THE MONITOR BECAME HIS VOICE. *With it he makes class reports and conversation. With it, Christian, 11, has been in the regular Osterville, MA public school since first grade.*

Until he found this window.

4 WITH THE PICTURES, HE MADE SENTENCES. *With the sentences, he made friends. Christian's monitor is the window between his non-verbal world and the speaking world of his friends. Through it, he teaches them many things.*

THE MONITORS THAT ARE BEST FOR CHRISTIAN'S NEEDS *can also speak to yours. Introducing the NEC MultiSync® Enterprise and Advanced Series, the monitors for people looking for superior, lifelike images. And the monitors for people who want the kind of flexibility that super high resolutions and refresh rates ensure.*

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	Max Res	Bandwidth	CRT Type	Pitch
A500	1280 x 1024 @ 60Hz	112MHz	Dot Trio	0.28mm dot
A700	1280 x 1024 @ 65Hz	119MHz	Dot Trio	0.28mm dot
E500	1280 x 1024 @ 65Hz	119MHz	CROMACLEAR	0.25mm mask
E700	1600 x 1200 @ 65Hz	177MHz	CROMACLEAR	0.25mm mask
E1100	1600 x 1200 @ 65Hz	177MHz	Dot Trio	0.28mm dot

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All things considered, however, the Latitude is a very worthy notebook. According to our fax-back survey, Dell notebook users are generally happy with their PCs' reliability and with the technical support the company provides, and Dell's policies are very good: a three-year warranty on parts and one year on labor, free on-site service for the first year, and around-the-clock technical support.

BUDGET NOTEBOOKS

This Month's Best Buys

1 COMPAQ ARMADA 1130T

PRO: Crisp display, low cost, very sturdy, fast

CON: No multimedia features or modem

If you want a rugged portable with good performance at a terrific price, the $1399 Armada 1130T fits the bill. Compaq slashed the price on it by $600, putting the Armada at the head of this month's budget notebooks chart.

Compaq Armada 1130T

Make no mistake, this portable is no-frills—there is no multimedia, no modem, and no infrared port, and its 1080MB hard drive is a little cramped by today's standards. Even ▶

TOP 20 NOTEBOOK PCs — PERFORMANCE

	POWER NOTEBOOKS	CPU	RAM (MB)	Secondary cache (K)	PC WorldBench score
1	Dell Latitude LM M166ST*	Pentium MMX-166	40	256	212
2	Dell Latitude XPi P133ST*	Pentium-133	24	256	166
3	WinBook LM	Pentium-133	16	256	182
4	Transmonde Vibrant 133T	Pentium-133	32	256	190
5	WinBook FX	Pentium-133	32	256	188
6	Gateway 2000 Solo 2100 S5-150	Pentium MMX-150	40	256	199
7	HP OmniBook 800CT	Pentium-133	16	256	168
8	Dell Latitude XPi CD M166ST	Pentium MMX-166	32	256	199
9	Compaq Presario 1080	Pentium MMX-166	16	256	197
10	ARM TS96CD-133T	Pentium-133	16	256	183
	BUDGET NOTEBOOKS				
1	Compaq Armada 1130T*	Pentium-120	16	0	140
2	HP OmniBook 5500CS*	Pentium-100	16	256	152
3	WinBook XP5 Pro P150	Pentium-150	16	256	183
4	Hitachi E133T/1000	Pentium-133	16	0	126
5	CTX EzBook 720CS	Pentium-120	16	256	167
6	Toshiba Satellite Pro 430CDS	Pentium-120	16	0	141
7	Gateway 2000 Solo 2100 S5-120	Pentium-120	16	256	171
8	AcerNote Light 382	Pentium-150	16	256	170
9	Mega Image Megabook 880	Pentium-100	16	0	87
10	Toshiba Satellite 200CDS	Pentium-100	8	0	91

*Best Buy

Word 7.0 for Windows 95 · Excel 7.0 for Windows 95 · Picture Publisher 6.0 for Windows 95 · Paradox 5.0 for Windows · WordPerfect 6.1 for Windows · 1-2-3 release 5 for Windows

HOW WE TEST All systems are tested with PC WorldBench, PC World's application-based benchmark. A higher PC WorldBench score is better. All PCs have Windows 95, and video resolution is set to 800 by 600 in 256 colors. We run automated scripts on six popular business applications, performing common tasks such as spelling checks, scrolls, saves, sorts, and recalculations. The PC WorldBench score is a sum of the weighted result of each script: Word (25 percent), Excel (20 percent), Picture Publisher (15 percent), Paradox (15 percent), WordPerfect (15 percent), and 1-2-3 (10 percent). For more details on our benchmark and how we run it, see PC World Online (www.pcworld.com/testing).

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Circle 141 on reader service card

so, you get a remarkable amount of notebook for the money. The system cranked out a PC WorldBench score of 140, very good for a Pentium-120 with 16MB of RAM. It's also the least expensive notebook we've seen with a color active-matrix screen—it's small at 10.4 inches, but offers bright, vivid 800 by 600 resolution. Compaq also bundled Microsoft Works 4.0, which integrates common business tasks such as word processing and spreadsheet work into one program.

The Armada's keys have crisp, lively action, and they're comfortably sized and well spaced. Unlike most new notebooks, the Armada features a trackball input device rather than a touchpad. Although small, the trackball made moving the cursor effortless. The two mouse buttons are so big that some people will need time to get used to them.

With a 7.5-pound traveling weight, the Armada 1130T is light and quite small. If you need to compute on the go, it has a good battery life of nearly 4 hours. The Armada series comes with well-written documentation. Compaq provides just a one-year warranty on this budget unit, but *PC World* readers in our fax-back survey give the company a very good rating for support and are generally pleased with the reliability of its notebooks.

2 HP OMNIBOOK 5500CS

PRO: Low cost, good battery life, high-speed infrared port, helpful documentation

CON: Dual-scan screen somewhat washed out, CD-ROM drive is optional

With both a nice PC WorldBench performance of 152 and a low $1620 price, HP's recently introduced OmniBook is a great deal in a basic notebook aimed at the corporate market.

The 5500CS is the fastest P-100 notebook we've tested and relatively long-winded: It lasted 4 hours in our battery tests. It also has one unusual high-end perk: a high-speed infrared port (4 megabits per second), which makes wireless LAN connections practical.

HP OmniBook 5500CS

We have a few beefs. We were relatively satisfied with the supplied 1358MB hard drive, but the notebook's price doesn't include a CD-ROM drive, and screen quality wasn't as good as we would have liked—as with many dual-scan displays, we had a tough time finding the cursor. Finally, HP's lack of weekend support pulls down its policies score, and weekday toll-free support is just 12 hours daily.

Even with these drawbacks, the OmniBook remains a very good value. HP backs its notebook for three years for both parts and labor. While we haven't received enough responses in our fax-back survey to rate HP's service quality on its notebooks, we've seen enough to suggest that readers are satisfied with their reliability.

New This Month

The following PCs made our Budget Notebooks chart for the first time this month. For original reviews of previously tested PCs on the chart, visit our Web page (www.pcworld.com/t20pcs).

6 TOSHIBA SATELLITE PRO 430CDS

PRO: Low price, very comfortable keyboard, good battery life

CON: Somewhat bulky, pale screen, small software bundle

The Satellite series of notebooks, including the 200CDS reviewed below, is Toshiba's entry-level product line; the Satellite Pro line is designed for people looking for a little more in a budget corporate notebook who don't mind spending accordingly. Compared with the 200CDS, the $1999 Satellite Pro 430CDS, for example, adds considerably more power (a PC WorldBench score of 141), RAM, and hard disk space, as well as a faster (10X) CD-ROM drive. This Pentium-120 notebook is still no speed demon, but it handles word processing and moderate spreadsheet and database tasks quite well. Its keyboard has an unusually comfortable feel for a notebook—the keys are very quiet and feel much like those on standard desktop keyboards.

The 430CDS has a few drawbacks, most notably with its 11.3-inch dual-scan screen. The pointer disappears briefly when you move it quickly across the screen, and the colors on this 800 by 600 panel look pale compared with those on the increasingly prevalent active-matrix screens. The screen can also make it difficult to work in varying light conditions, such as in a window seat on a flight. But you probably will not want to carry the machine around all the time, anyway. It weighs just over 8.8 pounds and is a little bulkier than most notebooks, measuring almost a foot wide and well over 2 inches thick.

Toshiba Pro 430CDs

Multimedia on the 430CDS is uneven. It comes with a fast 10X CD-ROM drive, but you have to either run it as an external drive bay, or swap out the floppy drive. (Swapping drives went very smoothly in our experience.) The unit has only one speaker, but it comes with a pair of Koss earphones that produce rich sound, and there's a convenient thumbwheel volume control on the front panel. Other niceties include MPEG I support, which lets you watch remarkably smooth video on the screen, and a Zoom Video slot, which accepts a PC Card adapter that can bring full motion video into your notebook. If you start collecting lots of multimedia files, however, you'll soon want a larger hard drive than the supplied 1.4GB unit.

The 430CDS doesn't come with much software. It includes several utilities, including TransXit's file synchronization package, but no games or productivity programs. We were more pleased, however, by the unit's battery life—this notebook chugged along for 4 hours and 10 minutes in our rundown test. We were also impressed with the documentation. The printed user's guide is comprehensive and clearly written, with many diagrams, and the on-screen manual has lots of easily searchable information. If the documentation doesn't answer your questions, you can call a technician at any time. Toshiba backs its Satellite Pro systems with a brief one-year parts and labor warranty. *PC World* readers responding to our fax-back survey say that Toshiba's ▶

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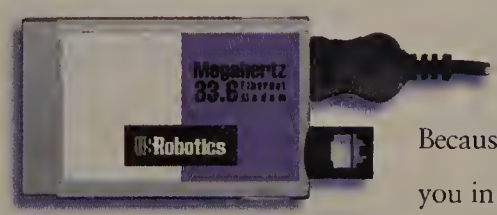

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Circle 238 on reader service card

notebooks continue to be reliable and its support still a little deficient.

If you like the 430CDS but want a better screen, you have a couple of options. The first is the Satellite Pro 430CDT. It didn't make the budget chart because of its relatively high $2699 price, but it's very similar to this unit and has a sharp active-matrix screen. The other is the next-generation Satellite Pro 440CDX, whose 12.1-inch screen is based on a new passive-screen technology called High Contrast Addressing Display. Based on our brief preview of this Pentium-133 notebook, the HCAD appeared to have richer colors, more contrast, and faster refresh rates that most dual-scan screens. The 440CDX should be available by the time this review is off the press.

8 ACERNOTE LIGHT 382

PRO: Terrific battery life, very fast, nice screen for a dual-scan, round-the-clock support

CON: Case a little flimsy, no bundled apps

If money is tight, take a hard look at Acer's new AcerNote Light 382, a Pentium-150 portable that costs only $1999. Its somewhat flimsy case may not hold up to constant travel as well as those of some other notebooks, but this is a nice multimedia portable for people on a budget.

The AcerNote Light 382 excels in two ways: performance and battery life. It ran up a 170 PC WorldBench score, ahead of the average of all P-166 notebooks we've reviewed, and making it the fastest you can buy for under $2000. And its battery life extended to a very lengthy 6.75 hours.

There's a lot else to like about the AcerNote, too. Although the screen is dual-scan, at first it was hard to distinguish from an active-matrix model. It's exceptionally bright and readable even at an angle, and the pointer stays in view during most normal mousing tasks. The pair of speakers, mounted at the screen hinges, sound a bit tinny but still offer richer audio than you'll find from most notebooks. The AcerNote Light is a decent multimedia machine, with a 16-bit sound card and internal 10X CD-ROM drive, and the 1GB hard drive offers a bit of breathing room for large media files. The floppy drive is strictly external—you can't swap it with the CD-ROM drive—but you can connect it to the AcerNote through a cable without having to turn the notebook on and off. The only bundled software, however, is Windows 95.

AcerNote Light 382

We found the AcerNote Light relatively easy to use, but you should give it a typing test before you buy it. We had to type firmly—but not uncomfortably so—on the keyboard, which is so quiet you won't annoy your seatmates on red-eye flights. The built-in touchpad has a nifty scrolling feature. Running your finger down an inside edge of the pad scrolls the document you're in, and you can stop the scrolling with a finger tap. It works very well after a little practice. The trackpad was hypersensitive at first, but we clicked on the pointing-device control icon on the Taskbar and followed the excellent instructions to tune it.

Support policies are only fair. Technical support is available around the clock, but the AcerNote Light 382 is covered by only a one-year warranty. Our fax-back survey indicates that Acer notebooks have below-average reliability.

10 TOSHIBA SATELLITE 200CDS

PRO: Terrific price, good battery life, 24-hour tech support, online documentation

CON: Small amount of RAM and hard drive space, no applications, heavy

If your computing needs and budget are modest, this Pentium-100 notebook is an attractive choice in a good basic corporate notebook. With only 8MB of RAM and an 772MB hard drive, the 200CDS is no desktop replacement. But its $1599 price is tough to beat, especially for a sturdy, well-made multimedia notebook with a 6X CD-ROM drive.

For such a low price, it's not surprising to find other drawbacks besides limited memory and a small hard drive. The Satellite 200CDS doesn't come with any software at a time when more and more vendors are including applications with their notebooks.

Toshiba Satellite 200CDS

What's surprising is how much notebook you do get for the money. With a PC WorldBench score of 91, the 200CDS is pretty slow by today's standards, but it's still fine for word processing and moderate spreadsheet work. The 200CDS's keyboard has snappy, responsive keys and is a pleasure to use, and the headphone jack and CD volume control are conveniently located on the front panel. The 11.3-inch screen is one of the better dual-scans we've seen. Its colors are relatively bright, with a minimum of shadowing, and text is razor sharp. Another feature that's bound to please is the built-in AC adapter, which means one less peripheral to bring along on a trip. If you do have to work away from wall power, you'll have juice for a while—we got nearly 4 hours of life in our rundown tests. Finally, good help is close at hand. The 200CDS comes with a well-written, illustrated on-screen manual that not only contains all the contents of the printed version but also is easily accessible and searchable.

In reliability and support, Toshiba puts in a mixed performance. According to our latest fax-back survey, readers are generally satisfied with the reliability of their Toshiba notebooks but find the company's support lacking. Its support policies are fair. While Toshiba covers parts and labor for only a year, support reps are available around the clock. ■

Beyond the Top 20

We evaluated these systems along with the others, but they didn't score high enough to reach the Top 20 Notebook PCs chart. For write-ups, see PC World Online (www.pcworld.com/t20pcsnaps).

- **5D Technologies 5D 9750**
- **Acer TI TravelMate 7060**
- **Acer Extensa 660 CDT**
- **AMS TravelPro 2010CX**
- **ARM TS753CD-113D**
- **Digital HiNote VP 575**
- **LEK Technologies FutureNote 200MX**
- **Maxtech YesBook X753 Plus**
- **NEC Versa 6200MX**
- **Olivetti Echos P133S 800**
- **Toshiba Tecra 510 CDT**

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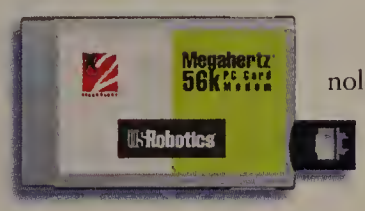

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Win an IBM PC 350

Have you ever contacted your PC maker for service and support? Or has your PC been trouble-free? Tell us about it! Fill out and fax in the questionnaire below—even if you have no problems to report, and even if you have responded to this survey before—and we'll enter you in a drawing to win an IBM PC 350, a Pentium-166 PC in this month's Top 20. Send in a separate copy of the survey for each of your PCs.

HOW TO ENTER: FOR BEST RESULTS, PHOTOCOPY THIS PAGE. Fax your completed survey to 415/357-4522. Do NOT fax a cover page. Or mail it to *PC World*, Box 7-SS, c/o 800-SCAN, 543 Howard St., San Francisco, CA 94105-3013. Surveys must be received by July 31.
PRIZE: One entry per person. IDG employees and their families are not eligible. One prize will be awarded through a random drawing. *PC World* will make reasonable efforts to contact winners by telephone and fax. If *PC World* is unable to do so within 30 days of the drawing, a new winner will be selected. No purchase necessary. Void where prohibited by law.
HOW TO FILL OUT THE FORM: Print your name (block capital letters) and your fax number, and fill the circles for each digit of your daytime phone number. Then fill out the questionnaire. AVOID GOING OUTSIDE THE LINES!

LAST, FIRST NAME

FAX NUMBER — —

ZIP CODE

Please fill in your daytime phone number below.

1	○	○	○	○	○	○	○	○	○	○
2	○	○	○	○	○	○	○	○	○	○
3	○	○	○	○	○	○	○	○	○	○
4	○	○	○	○	○	○	○	○	○	○
5	○	○	○	○	○	○	○	○	○	○
6	○	○	○	○	○	○	○	○	○	○
7	○	○	○	○	○	○	○	○	○	○
8	○	○	○	○	○	○	○	○	○	○
9	○	○	○	○	○	○	○	○	○	○
0	○	○	○	○	○	○	○	○	○	○

How did you get this copy of *PC World*?
○ By subscription ○ On the newsstand ○ From someone else

ABOUT YOUR PC

Who is the manufacturer of the PC you use most frequently?

○ Acer ○ Acma ○ ALR ○ Apple ○ AST ○ Austin (IPC) ○ Compaq ○ Compudyne ○ Comtrade ○ CTX ○ CyberMax ○ Dell
○ Diamond ○ Digital (DEC) ○ DTK ○ EPS ○ Epson ○ Everex ○ Fujitsu ○ Future Tech ○ Gateway 2ODD ○ Hewlett-Packard ○ HiO ○ Hitachi
○ Hyundai ○ IBM ○ Insight ○ Intelesys ○ Leading Edge ○ Micro Express ○ Micron ○ Midwest Micro ○ MIS ○ Nat'l Micro ○ NCR ○ NEC
○ Packard Bell ○ Panasonic ○ PerComp ○ Pionex ○ Polywell ○ Ouantex ○ Robotech ○ Samsung ○ Sharp ○ Sony ○ Swan ○ Sys Tech.
○ Tangent ○ Texas Instruments ○ Toshiba ○ Twinhead ○ Unisys ○ USA Flex ○ Vektron ○ WinBook ○ Xi ○ Zenith (ZDS) ○ Zenon ○ Other

What size is this PC?
○ Desktop
○ Notebook/laptop
○ Handheld

What is the CPU?
○ PowerPC
○ Pentium
○ Pentium Pro
○ 8D486
○ Other

Where did you buy this PC?
○ Local dealer
○ Mail/phone order
○ Direct from field sales force
○ Membership discount store
○ Computer superstore
○ Home electronics store
○ Retail store
○ Value-added reseller
○ Other

After ordering, how long did it take to get your PC?
○ Less than 1 week
○ 1-2 weeks
○ 3-4 weeks
○ More than 4 weeks

Who set up your PC?
○ Dealer/retailer/VAR
○ Staff computer technician
○ Self or coworker

Where do you use this PC? ○ At home/home office ○ At work ○ Both

WHEN YOU FIRST GOT YOUR PC

When did you buy this PC? (Specify month and year.)

○ Jan ○ Feb ○ Mar ○ Apr ○ May ○ June ○ July ○ Aug ○ Sept ○ Oct ○ Nov ○ Dec
○ 92 ○ 93 ○ 94 ○ 95 ○ 96 ○ 97

When you first set up your PC, were any components "dead on arrival" (DOA)?
○ Yes ○ No ○ Don't know

If so, which component was it? (Mark all that apply.)
○ Battery ○ CD-ROM ○ CPU ○ Floppy drive
○ Graphics/video board ○ Hard drive ○ Keyboard ○ Memory
○ Modem/fax board ○ Monitor/screen ○ Motherboard ○ Mouse
○ Power supply ○ Sound board ○ Other

Did your problem occur only after you added your own hardware or software?
○ Yes ○ No ○ Don't know

Would you buy this brand of PC again?
○ Yes ○ No ○ Not sure

How many times have you had a problem with this PC?
○ No problem ever ○ One ○ Two ○ Three ○ Four ○ More than four

If you have had a problem that you have not reported in a previous survey, please fill out the right column. If you are reporting a DOA for the first time, skip to the service section.

NEW PROBLEM REPORT

Answer for the most recent problem—*other than DOA*—not reported in a prior survey.

When did this problem occur? (Specify month and year.)

○ Jan ○ Feb ○ Mar ○ Apr ○ May ○ June ○ July ○ Aug ○ Sept ○ Oct ○ Nov ○ Dec
○ 92 ○ 93 ○ 94 ○ 95 ○ 96 ○ 97

How long after you purchased your PC did the problem occur?
○ Less than 1 month ○ 1-3 months ○ 4-6 months ○ 7-12 months ○ More than 12 months ○ Not sure

Did the problem occur as a result of adding new hardware or software?
○ Yes ○ No ○ Don't know

Did the problem occur under warranty?
○ Yes ○ No ○ Don't know

What was the problem finally identified as? (Mark all that apply.)
○ Faulty component ○ Incorrectly installed software ○ Wrong configuration ○ Faulty peripheral ○ Device conflicts ○ OS problem ○ Other ○ Don't know

If a component failed, which one was it? (Mark all that apply.)
○ Battery ○ CD-ROM ○ CPU ○ Floppy drive
○ Graphics/video board ○ Hard drive ○ Keyboard ○ Memory
○ Modem/fax board ○ Monitor/screen ○ Motherboard ○ Mouse
○ Power supply ○ Sound board ○ Other

SERVICE

Please use this section to describe the service and support you received for the problem reported above or the DOA reported at left.

Who fixed your PC?
○ Manufacturer
○ Dealer/store where purchased
○ Manufacturer's authorized repair technician
○ Self ○ Other

What types of service and support did you receive? (Mark all that apply.)
○ Phone ○ On site ○ In store
○ System swap ○ Component swap ○ Factory return

If you received phone service, how long were you on hold?
○ Not at all ○ Less than 1 minute ○ 1-2 minutes ○ 3-5 minutes ○ 6-1D minutes ○ 11-20 minutes ○ More than 2D minutes

How long did it take before you talked to the person who finally helped you?
○ Less than 15 minutes ○ 15 minutes-1 hour ○ 2-5 hours ○ 6-1D hours ○ 11-24 hours ○ 1½-2 days ○ 3-5 days ○ 1 week or more

How long did it take to resolve the problem completely?
○ 1-2 days ○ 3-7 days ○ 8-14 days ○ 15-3D days ○ More than 1 month ○ Never resolved ○ Awaiting resolution

Was it resolved to your satisfaction?
○ Yes ○ No

How would you rate the person(s) who helped you?

	Poor		Good		Excellent
Courtesy	○	○	○	○	○
Knowledge	○	○	○	○	○
Follow-through	○	○	○	○	○

Based on the service and support you received, would you buy this brand of PC again?
○ Yes ○ No

On the whole, how satisfied are you with the service and support you received?
○ Not at all ○ ○ Satisfied ○ ○ Extremely satisfied

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OPTIQUEST MONITORS							
	Q100	V775	V773	Q71	V655	Q53	V641
Size/Viewable	20"/18.4"	17"/16.0"	17"/15.8"	17"/16.0"	15"/13.8"	15"/13.8"	14"/13.2"
Dot Pitch	0.28mm	0.26mm	0.26mm	0.28mm	0.28mm	0.28mm	0.28mm
Max. Resolution	1,600 x 1,280	1,600 x 1,280	1,280 x 1,024	1,280 x 1,024	1,280 x 1,024	1,280 x 1,024	1,024 x 768
Horiz. Scan Freq.	30-86kHz	30-85kHz	30-69kHz	30-70kHz	30-65kHz	30-70kHz	31.5/37.5/48.4kHz
MSRP	$1,149	$699	$599	$559	$339	$319	$229

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PC WORLD

TOP 10 PRINTERS

	MONOCHROME WORKGROUP PRINTERS	Month tested	Street price (4/2/97)	Overall rating	Speed for plain text (ppm)	Speed for full-page graphics (ppm)	Comments	Reader service number
1	Lexmark Optra S 1650 800/539-6275 www.lexmark.com	NEW	$1300	94	11.6	2.4	**FEATURES:** 16-ppm laser. Standard 4MB of RAM; 600-by-600-dpi resolution (also true 1200 by 1200 dpi); 250 sheets input and output. **PRO/CON:** Extremely fast, easy to use, very good print quality. Universal Optra manual sometimes confuses differences between models.	653
2	Lexmark Optra S 1250 800/539-6275 www.lexmark.com	NEW	$1135	91	9.6	2.1	**FEATURES:** 12-ppm laser. Standard 4MB of RAM; 600-by-600-dpi maximum resolution (also true 1200 by 1200 dpi); 250 sheets input and output. **PRO/CON:** Fast, easy to use, very good print quality. Fewer options than the Optra S 1650, and manual sometimes confuses differences between models.	654
3	HP LaserJet 5M 800/752-0900 www.hp.com	retested this month	$1799	91	9.6	1.9	**FEATURES:** 12-ppm laser. Standard 6MB of RAM; 600-by-600-dpi maximum resolution; 250 sheets input and output. **PRO/CON:** Very good print quality and design; updated drivers produced faster text and graphics speeds. Expensive, but unlike other printers on the chart it includes ethernet and LocalTalk.	655
4	IBM Network Printer 12 800/358-6661 www.printers.ibm.com	Mar 97	$1250	90	8.9	2.4	**FEATURES:** 12-ppm laser. Standard 4MB of RAM; 600-by-600 dpi resolution; 250 sheets input, 270 output. **PRO/CON:** Very good print quality, easy-to-use control panel; support policies include 24-hour, 7-day technical help. Numerous manuals can be confusing; slowest text printer on chart.	–
5	Okidata OkiPage 16n 800/654-3282 www.okidata.com	NEW	$999	88	12.4	1.9	**FEATURES:** 16-ppm LED. Standard 2MB of RAM; 600-by-600-dpi resolution; 500 sheets input, 250 output. **PRO/CON:** Lowest price and fastest text speed on chart. Tricky installation and control panel; multilingual manual is hard to use; not good for graphics—gray-scale images are overly dark.	656
	COLOR WORKGROUP PRINTERS							
1	HP DeskJet 1600CM 800/752-0900 www.hp.com	July 96	$1999	89	4.4	0.5	**FEATURES:** 8-ppm monochrome/2-ppm color ink jet. Standard 6MB of RAM; 600-by-600 dpi monochrome, 300-by-300-dpi color resolution. **PRO/CON:** Inexpensive, good print quality, adequate speed; PostScript and ethernet included. Ink jet pages, unlike a laser's, are sensitive to moisture and light.	657
2	Tektronix Phaser 350 800/835-6100 www.tek.com	Jan 97	$3420	87	3.4	0.9	**FEATURES:** 6-ppm solid ink printer. Standard 8MB of RAM; 300-by-300 dpi monochrome and color resolutions. **PRO/CON:** Stellar color quality, fast graphics speed; solid ink blocks are easy to load; black ink is free for as long as you own printer. Text speed is slow, and it takes only letter-size paper.	658
3	HP Color LaserJet 5M 800/752-0900 www.hp.com	retested this month	$5199	87	5.8	0.7	**FEATURES:** 10-ppm monochrome/3-ppm color laser. Standard 24MB of RAM; 300-by-300-dpi monochrome and color resolutions. **PRO/CON:** Dramatic $2196 price drop makes it lowest-price color laser on chart. Print quality is good for text and simple graphics, but not sophisticated continuous-tone images like photographs.	659
4	Xerox XPrint 4920 Plus 800/349-3769 www.xerox.com	Sept 96	$6500	86	5.5	0.3	**FEATURES:** 12-ppm monochrome/3-ppm color laser. Standard 16MB of RAM; 600-by-600-dpi monochrome and color resolutions. **PRO/CON:** Superb print quality; optional $1341 feeder gives it the highest maximum paper capacity (1750) of any color laser on chart. Slow printing full-page graphics.	660
5	Tektronix Phaser 550 800/835-6100 www.tek.com	July 96	$6532	84	5.6	0.5	**FEATURES:** 14-ppm monochrome/5-ppm color laser. Standard 8MB of RAM; 600-by-600-dpi monochrome and color resolutions, true 1200 dpi with 24MB of RAM. **PRO/CON:** Very good print quality; only color laser that accommodates labels and manual double-sided printing. Proprietary RAM is expensive.	661

Best Buy www.pcworld.com/t10printers. Windows 95-certified Plug and Play All products: 906

HOW WE TEST The overall rating for both monochrome and color workgroup printers is based on print quality (27 percent), price (20 percent), features and ease of use (20 percent), speed (15 percent), service and support (13 percent), and cost of consumables (5 percent). For all ratings, higher is better. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

MAJOR SHAKE-UPS transform the monochrome printer chart this month: Newcomers from Lexmark storm to the top, former champion IBM takes a fall, and Okidata drops a pricing bombshell. All in all, three new printers make the chart.

At the center of all the activity: Lexmark's new Optra S 1650 and S 1250 lasers, which took the Best Buy and second-place positions. Faster drivers for Hewlett-Packard's LaserJet 5M boost- ▶

ed it to third place. May's Best Buy, IBM's Network Printer 12, fell to fourth. At fifth place, the new Okidata OkiPage 16n is the first 16-ppm printer we've seen for $999.

The color chart was peaceful by comparison. We retested the HP Color LaserJet 5M with updated PostScript drivers, but it rose from fourth to third place only because of a dramatic price drop from $7395 to $5199, making it the least expensive color laser on the chart.

LEXMARK REGAINS THE TOP

LEXMARK'S NEW 16-pages-per-minute Optra S 1650 and 12-ppm Optra S 1250 have overtaken the IBM Network Printer 12, only four months after the IBM did the same to the old line of Optras. The Optra S lasers are fast for the price: The Optra S 1250 prints text at 9.6 ppm compared with the IBM Network Printer 12's 8.9 ppm, but it costs $115 less. And the Optra S 1650, which is only $50 more than the IBM, prints text at 11.6 ppm.

Print quality is sharp at the Optras' default 600-dots-per-inch resolution; only the gray-scale images looked a little coarse. However, the Optras are the only monochrome printers on the chart that are capable of true 1200-dpi, and our samples looked even better at that resolution.

The completely new Optra S designs include accessible paper trays, straightforward control panels, and numerous paper, network, and storage options. The Optras are still in the process of Plug and Play certification, but they installed flawlessly in our tests.

The only blemish on the Optra S series is the manual, which is the same for all the Optra lasers. Sometimes it's hard to tell which models have which options, and that's a problem because the installation procedure for some options varies depending on the model.

The Lexmark manual was better than that of the new Okidata OkiPage 16n, however; Okidata's multilingual approach was a mess to read. That and other ease of use problems do not overshadow the main selling point of the OkiPage: a $999 street price that's the lowest on the chart—and $301 less than the Optra S 1650, the chart's only other 16-ppm printer. The Okidata is also unique for using an array of light-emitting diodes (LEDs), instead of a laser, to print.

DIRT-CHEAP LASER IS FAST, TOO

THE OKIPAGE 16N would make a good text workhorse: Its 12.4-ppm text speed is the fastest we've seen, and the quality is good. The OkiPage 16n's 1.9-ppm graphics speed is slower than most printers on the chart, however, and the gray-scale images we printed on it were overly dark.

Ease of use is where the Okidata printer is weakest. The control panel's multiple-function buttons are confusing to navigate. Most annoying is the status dialog box that sticks around on the desktop long after you've stopped using the printer.

OUR NEW MONOCHROME BEST BUY is the Lexmark Optra S 1650, a fast laser with a low price and an easy-to-use design.

We're reserving judgment on the Xerox DocuPrint 4512, a new 12-ppm monochrome laser, until it resolves some problems with printing graphics. It struggled in our CorelDraw tests and couldn't print gray-scale images properly in Adobe Photoshop. Xerox recommended various work-arounds but had no scheduled date for releasing fixes.

RETESTED HPS RANK HIGHER

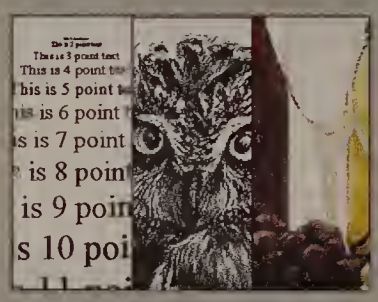
WE RETESTED TWO Hewlett-Packard workgroup printers—both on our chart for many months—with their most current drivers. The HP LaserJet 5M monochrome laser showed an impressive boost in graphics speed, from 1.1 ppm to 1.9 ppm—enough to climb to third place from fourth; text speed improved slightly.

We usually test color printers in PostScript. But when we first examined the HP Color LaserJet 5M a year ago, its PostScript drivers were unable to finish our test suite, so we used its PCL drivers instead. At the time, it turned in a fast 6.9-ppm text speed and 0.9-ppm graphics speed. Retested this month in PostScript, the Color LaserJet 5M had no further problems. Although it's slower in PostScript than in PCL on the same tests, it's still fast compared with its peers. Finally, last month we reported that this machine is Plug and Play–certified; it is not, but it installed flawlessly nevertheless.

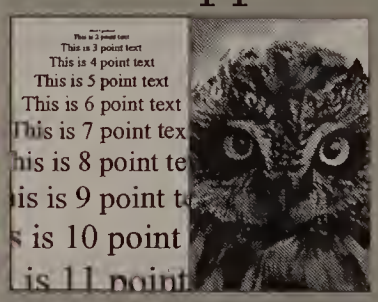
—Dan Littman ■

PRINT QUALITY SAMPLES

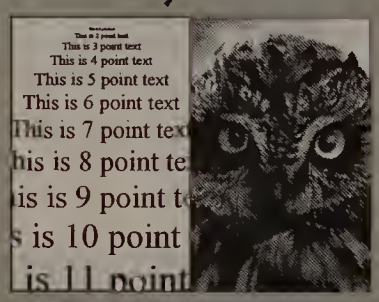
Lexmark, Okidata Grapple With Gray Scale



HP DESKJET 1600CM
Our long-standing color ink jet Best Buy prints good text and gray-scale images, plus attractive color—achieving near-laser quality for significantly less money.



LEXMARK OPTRA S 1650
The new monochrome Best Buy prints very good text at all point sizes. Gray-scale images tend to look a little coarse, but the gray levels are nicely subtle.



OKIDATA OKIPAGE 16N
This fast LED printer offers text as sharp as a laser's, but the gray-scale images we printed look dark and a little foggy compared to the laser printers we've tested.

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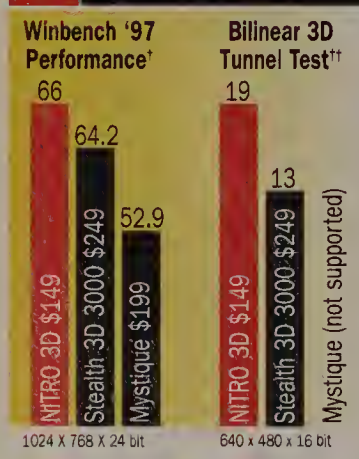

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PC WORLD

TOP 10 MONITORS

	17-INCH MONITORS	Month tested	Street price (4/21/97)	Overall rating	Quality of text/graphics	Comments	Reader service number
1	Iiyama Vision Master Pro 17 800/594-7476, 800/594-7480 www.iiyama.com	Jan 97	$698	93	very good/ excellent	**FEATURES:** 15.9-inch viewable screen, .25mm Diamondtron tube, up to 85-Hz refresh rate,[1] Level 2b Plug and Play ready,[2] three-year warranty, 12-hour weekday toll-free support. **PRO/CON:** $101 price drop, great graphics, sharp text, easy-to-adjust on-screen menus, large viewable area; two faint lines visible across screen.	668
2	ViewSonic PT775 800/888-8583 www.viewsonic.com	NEW	$899	90	excellent/ excellent	**FEATURES:** 15.9-inch viewable screen, .25mm Diamondtron tube, up to 119-Hz refresh rate,[1] Level 2b PnP ready,[2] three-year warranty, 11-hour weekday toll-free support. **PRO/CON:** Super text and graphics, large viewable area, easy to adjust, TCO'92 compliant, color correction utility; pricey, two faint lines visible across screen.	669
3	Dell UltraScan 1000HS 800/289-3355 www.dell.com	NEW	$649	84	very good/ very good	**FEATURES:** 15.9-inch viewable screen, .25mm Trinitron tube, up to 105-Hz refresh rate,[1] Level 2b PnP ready,[2] 24-hour toll-free support. **PRO/CON:** Razor-sharp text and graphics detail for a good price, TCO'92 compliant, ample controls are easy to adjust; brief one-year warranty, two faint lines across screen.	670
4	Panasonic PanaSync S17 800/742-8086 www.panasonic.com	Sept 96	$629	84	very good/ very good	**FEATURES:** 15.7-inch viewable screen, .27mm dot pitch tube, up to 85-Hz refresh rate,[1] Level 2b PnP ready,[2] three-year warranty, 24-hour toll-free support. **PRO/CON:** $70 price drop, very crisp text and graphics; on-screen menu icons are difficult to decipher, must press control buttons too much to find on-screen menu items.	671
5	Mitsubishi Diamond Pro 87TXM 800/843-2515 www.mitsubishi-display.com	Mar 97	$799	84	very good/ good	**FEATURES:** 15.7-inch viewable screen, .25mm Diamondtron tube, up to 107-Hz refresh rate,[1] Level 2b PnP ready,[2] three-year warranty, 12-hour weekday toll-free support. **PRO/CON:** Crisply defined text, accurate color rendition, easy-to-use controls, TCO'92 compliant; two faint lines visible across screen.	672
6	Continental DigiView 1709D 818/327-8899 www.digiview.com	Sept 96	$699	84	very good/ very good	**FEATURES:** 15.9-inch viewable screen, .25mm Diamondtron tube, up to 101-Hz refresh rate,[1] Level 2b PnP ready,[2] three-year warranty, 8-hour weekday toll-free support. **PRO/CON:** $100 price drop, crisp text and pictures, easily adjustable screen; rear on/off switch, short support hours, two faint lines visible across screen.	673
7	ViewSonic 17GS 800/888-8583 www.viewsonic.com	Mar 97	$619	83	very good/ very good	**FEATURES:** 15.9-inch viewable screen, .27mm dot pitch tube, up to 85-Hz refresh rate,[1] Level 2b PnP ready,[2] three-year warranty, 11-hour weekday toll-free support. Less expensive, dot pitch alternative to Best Buy PT775. **PRO/CON:** $30 price drop, well-defined text and images, accurate colors; control menus awkward to use.	674
8	Princeton Graphic Systems E075 800/747-6249 www.prgr.com	Mar 97	$648	83	good/ very good	**FEATURES:** 15.8-inch viewable screen, .26mm dot pitch tube, up to 120-Hz refresh rate,[1] Level 2b PnP ready,[2] three-year warranty, 24-hour toll-free technical support (automated after 5 p.m.). **PRO/CON:** $51 price cut, very detailed graphics, high refresh rates; type is slightly ghosted, must hunt down on-screen menu items.	675
9	NEC MultiSync P750 800/632-4636 www.nec.com	Mar 97	$949	83	very good/ good	**FEATURES:** 15.6-inch viewable screen, .25mm CromaClear tube, up to 117-Hz refresh rate,[1] Level 2b PnP ready,[2] three-year warranty, 12.5-hour weekday toll-free support. **PRO/CON:** $100 price drop, very sharp text, realistic color, easy-to-use on-screen menus; smallish viewable area, most expensive monitor on chart.	676
10	IBM P70 800/426-2968 www.pc.ibm.com	Sept 96	$919	83	very good/ very good	**FEATURES:** 15.9-inch viewable screen, .25mm Trinitron tube, up to 85-Hz refresh rate,[1] Level 2b PnP ready,[2] three-year warranty, 24-hour toll-free technical support. **PRO/CON:** $150 price drop, sharp text and graphics, easy-to-use on-screen menus; still expensive, two faint lines visible across screen.	–

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[1] Highest refresh rate at 1024 by 768 resolution. [2] Level 2b Plug and Play monitors and graphics cards can communicate bidirectionally. However, Windows 95 does not fully utilize monitor Plug and Play.

HOW WE TEST Ten judges rate a monitor's text and graphics quality. We evaluate each unit on how well it displays typical business letters, spreadsheets, Web pages, and scanned images. The overall rating is based on text and graphics quality (25 percent each), features and ease of use (25 percent), price (20 percent), and service and support (5 percent). The best possible overall rating is 100. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

IIYAMA tightens its grip on the number one spot this month with a $101 price cut. With great graphics that match the Iiyama's and even sharper text, the new ViewSonic PT775 debuts at number two. This model replaces the PT770 (number five in March). It costs $201 more than the Iiyama, but it's tops for graphics pros. The $649 Dell UltraScan 1000HS earns a third-place showing with an attractive price and extensive adjustability.

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*PC World, best overall PC company for reliability and service, December, 1996.

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NOS/software support (3 incident resolutions/1st year), 7x24

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PC WORLD

TOP 10 GRAPHICS BOARDS

	GRAPHICS BOARDS	Month tested	Street price (4/25/97)	Overall rating	PC WorldBench graphics score	Comments	Reader service number
1	STB Nitro 3D 888/234-8750 www.stb.com	NEW	$149	104	189 very good	**FEATURES:** 4MB of EDO DRAM, 120-Hz refresh rate at 1024 by 768, optional TV tuner, 3-D acceleration, bilinear video interpolation, Active Movie MPEG player, S3 Virge/GX chip. **PRO/CON:** Fast 2-D and 3-D performance, excellent AVI and MPEG playback, lifetime warranty; not all components installed automatically.	737
2	Hercules Terminator 3D/DX 800/532-0600 www.hercules.com	June 97	$149	104	189 very good	**FEATURES:** 4MB of EOO DRAM, 120-Hz refresh rate at 1024 by 76B, 3-D acceleration, bilinear video interpolation, Xing MPEG software, S3 Virge/DX chip. **PRO/CON:** 2-D and 3-D graphics improved over Terminator 3D, excellent MPEG playback, good software; mediocre AVI playback.	738
3	Matrox Mystique 800/361-1408 www.matrox.com/mga	May 97	$149	102	185 very good	**FEATURES:** 4MB of SGRAM, 130-Hz refresh rate at 1024 by 768, 3-D acceleration, bilinear video interpolation, Compcore MPEG software, MGA-1064SG chip, bundled games. **PRO/CON:** Extra RAM improves some of the best 3-D here, good AVI and MPEG video playback, 2MB version also good; refresh rates hard to set.	739
4	Diamond Stealth 3D 3000XL 800/468-5846 www.diamondmm.com	Mar 97	$213	102	184 very good	**FEATURES:** 4MB of VRAM, 120-Hz refresh rate at 1024 by 76B, 3-D acceleration, bilinear video interpolation, Mediamatics MPEG software, S3 Virge/VX chip, bundled games. **PRO/CON:** Good for graphical apps, great software utilities, excellent AVI and video playback; expensive.	740
5	STB Velocity 3D 888/234-8750 www.stb.com	Feb 97	$199	101	187 very good	**FEATURES:** 4MB of VRAM, 120-Hz refresh rate at 1024 by 768, 3-D acceleration, bilinear video interpolation, Mediamatics MPEG software, S3 Virge/VX chip, bundled games. **PRO/CON:** Good for graphically intense programs, memory upgradable, lifetime warranty; mediocre AVI and MPEG video playback.	741
6	STB Lightspeed 128 888/234-8750 www.stb.com	Aug 96	$99	101	186 very good	**FEATURES:** 2.25MB of MDRAM, 120-Hz refresh rate at 1024 by 768, bilinear video interpolation, Xing MPEG software, Tseng Labs ET6000 chip. **PRO/CON:** Performs well with business and graphics programs, perfect AVI video playback, excellent MPEG, lifetime warranty, low price; no 3-D acceleration.	742
7	Matrox Millennium 800/361-1408 www.matrox.com/mga	Apr 97	$219	100	187 very good	**FEATURES:** 4MB of WRAM, 120-Hz refresh rate at 1024 by 768, Compcore MPEG software, Matrox MGA-2064W chip, bundled game and 3-D graphics program. **PRO/CON:** Fast, superb AVI and MPEG video, great software utilities, upgradable memory; expensive, no bilinear interpolation for sharp images.	743
8	ATI 3D Xpression+ PC2TV 905/882-2600 www.atitech.ca	Jan 97	$189	99	180 very good	**FEATURES:** 4MB of SDRAM, 150-Hz refresh rate at 1024 by 768, 3-D acceleration, bilinear video interpolation, ATI MPEG player, ATI Rage II chip, bundled games and 3-D graphics programs. **PRO/CON:** More colors at high resolutions, connects to a TV, excellent AVI and MPEG video; 3-D quality is merely adequate.	744
9	Diamond Stealth 3D 2000 Pro 800/468-5846 www.diamondmm.com	NEW	$180	99	182 very good	**FEATURES:** 4MB of EDO DRAM, 100-Hz refresh rate at 1024 by 76B, 3-D acceleration, bilinear video interpolation, Mediamatics MPEG software, S3 Virge/DX chip, bundled multimedia software. **PRO/CON:** Excellent MPEG and AVI video playback; software installation is difficult, performance could be better for this chip.	745
10	VideoLogic GrafixStar 600 800/578-5644 www.videologic.com	Apr 97	$149	99	189 very good	**FEATURES:** 4MB of MDRAM, 120-Hz refresh rate at 1024 by 76B, bilinear video interpolation, Xing MPEG software, Tseng Labs ET6000 chip, bundled multimedia apps. **PRO/CON:** Very fast 2-D performance, excellent software utilities; no 3-D acceleration, average AVI and MPEG performance.	746

Best Buy For expanded reviews, visit www.pcworld.com/t10graphics. Windows 95 Plug and Play All products: 911

HOW WE TEST We tested PCI boards under Windows 95 with PC WorldBench 1.0 at 800 by 600 resolution and 16.8 million colors (reported here) and at 1024 by 768 and 65,536 colors. Boards were tested in a Dell Dimension XPS P133c with 16MB of EDO ORAM and 256K of pipeline-burst secondary cache. The overall rating is based on performance (40 percent), features (30 percent), price (20 percent), and support policies (10 percent). For all ratings, higher is better. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

GOOD NEWS for gamers: The first-place Best Buy STB Nitro 3D makes 3-D faster and smoother. Based on S3's Virge/GX—the next generation of the Virge chip—the Nitro promises to render 3-D up to three times faster than boards with the older chip. Other boards on the chart, including the second-place Hercules Terminator 3D/DX and the new Diamond Stealth 3D 2000 Pro in ninth, also have chips that will improve 3-D performance. ■

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PC WORLD

TOP 10 MODEMS

	INTERNAL MODEMS	Month tested	Street price (4/15/97)	Overall rating	Average transfer time per MB (min:sec)	Comments	Reader service number
1	U.S. Robotics Courier V.Everything 800/877-2677 www.usr.com	NEW	$215	80	2:44	**FEATURES:** 33.6-kbps, 8-bit card, FlashROM, 230.4-kbps modem-to-PC speed, Caller ID, distinctive ring, QuickLink II fax/data software. **PRO/CON:** Thorough and accessible documentation, solid performer, toll-free tech support, cross-ship replacement of modem by vendor; expensive.	613
2	Zoom FaxModem V.34I Plus 800/631-3116 www.zoomtel.com	retested this month	$89	80	2:38	**FEATURES:** 33.6-kbps, 8-bit card, MNP10 and MNP10EC cellular protocols, stores multiple profiles, distinctive ring, Comit and WinFax Lite fax/data software. **PRO/CON:** Flawless installation, cheapest modem on the chart, cross-ship replacement, very fast, seven-year warranty; no security features.	614
3	Hayes Optima 336B Internal Business Modem 770/840-9200 www.hayes.com	NEW	$249	79	2:31	**FEATURES:** 33.6-kbps, 16-bit card, FlashROM, Caller ID, 230.4-kbps modem-to-PC speed, voice mail, distinctive ring, SmartCom Message Center LE fax/data software. **PRO/CON:** Fastest modem tested, full security, cross-ship replacement; very expensive, 8.5-inch card may be hard to install.	615
4	Diamond Multimedia SupraExpress 336i Sp with ASVD 800/727-8772 www.diamondmm.com	retested this month	$130	78	2:45	**FEATURES:** 33.6-kbps, 16-bit card, distinctive ring, FlashROM, full-duplex speakerphone, voice mail, ASVD, Caller ID, Comit and FaxTalk Messenger fax/data software. **PRO/CON:** Tech support available 14 hours per day during the week, 8 hours on Saturdays, cross-ship replacement; average performer, pricey.	616
5	Shark Multimedia Baby Tiger 336R 800/800-3321 www.sharkmm.com	NEW	$95	79	2:38	**FEATURES:** 33.6-kbps, 16-bit card, MNP10 and MNP10EC cellular protocols, distinctive ring, voice mail, full-duplex speakerphone, DSVD, Caller ID, FaxWorks Voice voice/fax/data software. **PRO/CON:** Great performer, inexpensive; minimal support policies, 8-inch card might get in the way.	617
6	Wisecom Accelerator IV 33600 Voice Internal 888/9473266 www.wisecominc.com	NEW	$99	78	2:42	**FEATURES:** 33.6-kbps, 16-bit card, distinctive ring, voice mail, full-duplex speakerphone, ASVD, Caller ID, SuperVoice voice/fax/data software. **PRO/CON:** Inexpensive, above-average performer, toll-free tech support; installation is a nightmare, not FlashROM upgradable.	618
7	Practical Peripherals Practical Internet Kit 770/441-0896 www.practinet.com	retested this month	$99	76	2:48	**FEATURES:** 33.6-kbps, 16-bit card, QuickLink II Windows/DOS fax/data software, lifetime warranty. **PRO/CON:** Inexpensive, great support policies including cross-ship replacement and weekend tech support; paltry documentation, installation guide could be clearer, below-average performer.	619
8	Hayes Accura 336 Total Gaming Solution 770/840-9200 www.hayes.com	NEW	$179	76	2:49	**FEATURES:** 33.6-kbps, 16-bit card, voice mail, full-duplex speakerphone, DSVD, Caller ID, stores multiple profiles, SmartCom Message Center LE voice/fax/data software. **PRO/CON:** Cross-ship replacement, comes with microphone, headset, WebTalk; below-average performer, expensive.	620
9	Boca 33.6 Game/Business Modem 561/997-7202 www.bocaresearch.com	NEW	$120	76	2:49	**FEATURES:** 33.6-kbps, 16-bit card, voice mail, full-duplex speakerphone, DSVD, Caller ID, QuickLink Message Center voice/fax/data software. **PRO/CON:** Great software bundle includes both game and business titles; below-average performer, CD-ROM containing drivers not clearly labeled.	621
10	Practical Peripherals Practical 336 Voice/Data/Fax 770/441-0896 www.practinet.com	retested this month	$119	74	3:00	**FEATURES:** 33.6-kbps, 16-bit card, voice mail, full-duplex speakerphone, distinctive ring, Caller ID, Practica Message Center LE voice/fax/data software. **PRO/CON:** Support policies include lifetime warranty, weekend tech support, cross-ship replacement; slowest modem on chart, minimal documentation.	622

Best Buy For expanded reviews, visit www.pcworld.com/t10modems. Windows 95-certified Plug and Play All products: 901

HOW WE TEST We test a pair of identical modems on a simulated phone network. For the phone line test, we send a text file over 55 line conditions. For the file type test, we send five files—graphics, text, program, and compressed file types, plus a mixture of these four types—over one line condition. We then average the results of the two tests. The overall rating is based on performance (43 percent), features (26 percent), price (12 percent), support (10 percent), and ease of use (9 percent). Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

IN WHAT WILL probably be the last Top 10 chart before the onslaught of 56-kbps products, we find six new faces sprinkled among the old faves, including a new number one Best Buy—U.S. Robotics' Courier V.Everything. Zoom's FaxModem V.34I Plus earns the other Best Buy. For the first time, four modems on our chart come in under $100—a very welcome trend. For in-depth looks, see our modem roundup, "33.6 and Getting Faster." ■

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Finally, there's a UPS that belongs on TOP of your desk and not by your feet.

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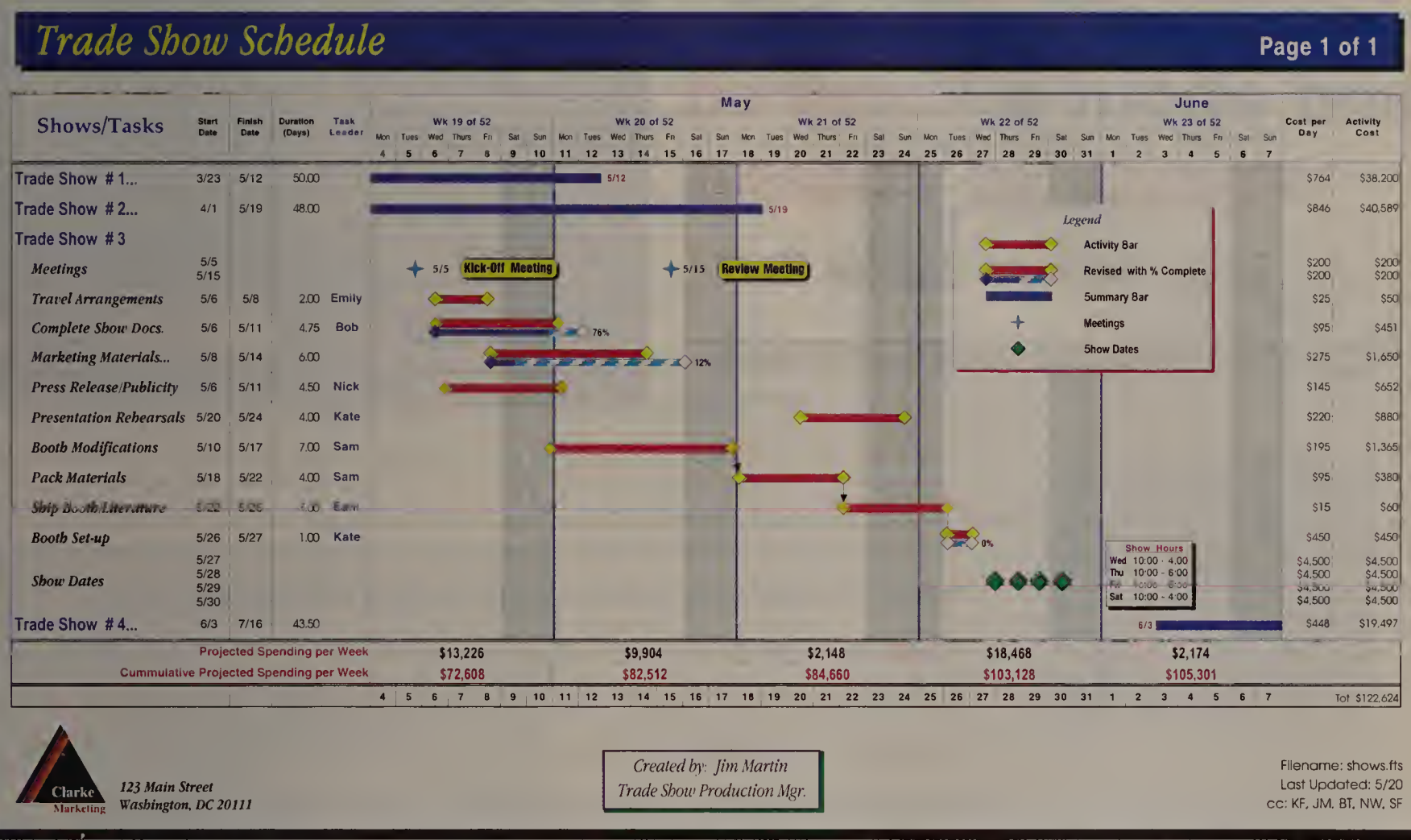

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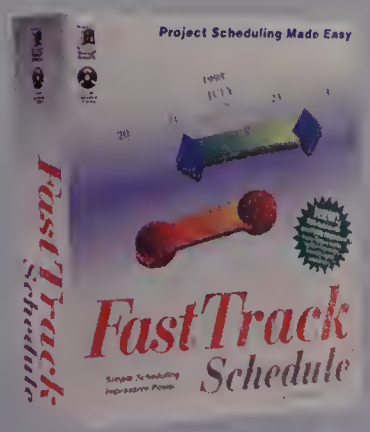

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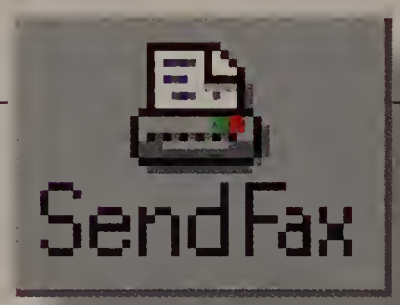

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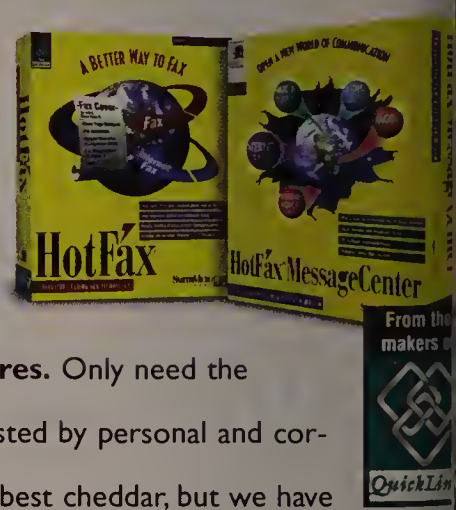

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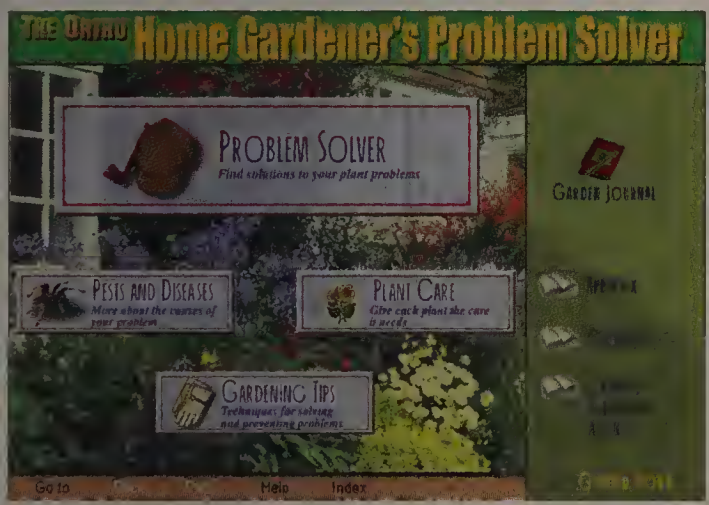
Help for Home Video, Garden Solutions

STOP BUGGING ME

DESPITE YOUR BEST efforts, your green thumb has turned your garden into a dried-out shade of brown. What's wrong? Is it a fungus? Not enough water? **The Ortho Home Gardener's Problem Solver,** with its database of 700 problems that afflict flora from houseplants to plum trees, can help you determine what's ailing your plants and offer helpful suggestions on how to fix it. You can also use the Garden Journal to create garden to-do lists and maintenance schedules. Problem Solver's interface is intuitive and easy to navigate, and includes Internet links to Gardening .com (www.gardening.com), a virtual encyclopedia of all things green and growing. The CD-ROM is not for seasoned gardeners; they probably have most of what's included committed to memory. But for the rest of us, Problem Solver is a welcome basic reference. —*Angela Freeman*



PESTS BEWARE: The Ortho Home Gardener's Problem Solver will help users maintain a beautiful garden.

The Ortho Home Gardener's Problem Solver

GRADE: **B**; PRICE: $30 street; Books That Work; 800/242-4546; www.ortho.gardening.com

READER SERVICE NO. 625

SOUR GRAPES

IF THIS CD-ROM were a wine, I'd say it's opaque and has a nasty nose, little flavor, and no follow-through. Ostensibly, **Wines of the World 3.0** is an improvement on the previous edition. Yet, like its predecessor, it offers scant information for wine lovers beyond generic fluff. Individual wine reviews lack depth and are hard to find due to the poorly designed database. The only real and welcome update is the link to excellent Web sites, where you'll find info on wine regions, grape varietals, wine tasting reports and reviews, and online stores. Skip the disc and go straight to the company Web site. —*Michael S. Lasky*

Wines of the World 3.0

GRADE: **F**; PRICE: $30 street; Multicom Publishing; 800/850-7272; www.multicom.com/cdjg/winegold/

READER SERVICE NO. 624

FLICK TRICKS

DESCRIBING **You Don't Know Jack Movies** as a film trivia game is like calling *Naked Gun* a cop movie: It's accurate but misses the point. Like the first YDKJ, this irreverent game exists, first and foremost, to make you laugh. The questions, in categories like "Ron Howard's End," are silly and often tasteless, and the sarcastic narrator always has a quip ("Let me show you what somebody smart would have picked"). The more you know about movies, the better you'll score, but you'll have fun even if you lose. —*Lincoln Spector*

You Don't Know Jack Movies

GRADE: **A**; PRICE: $30 street; Berkeley Systems; 800/527-7440; www.berksys.com

READER SERVICE NO. 627

Video Editing for Dummies

EVER TRIED TO condense video footage from your family vacation onto one reasonably interesting tape? It used to mean breaking the bank and devoting your adult life to mastering the equipment. But with **VideoDirector Studio 200**, you can edit all that long, boring vacation footage into snappy little (dare I say professional quality?) films even if you're all thumbs and your net worth is less than your family's collective IQ. With no cards to install, setup is easy. The TV dinner-size unit plugs in to the parallel port, a free serial port, a camcorder, and a VCR via a special cable. Adding titles, voice-overs, and music as well as transitions like wipes and dissolves is pretty painless. —Shane Mooney

VideoDirector Studio 200

GRADE: **A-**; PRICE: $299 list; Pinnacle Systems; 888/484-3366; www.videodirector.com

READER SERVICE NO. 626

EASY EDITING: VideoDirector Studio 200 makes it easy to trim your home videos.

EDITED BY
Christina Wood

HUNKA BURNIN' CD-ROM

ELVIS HASN'T LEFT this building. Fans of the King can spend hours with him in **Virtual Graceland**, a two-disc CD-ROM. It begins with a guided tour in which a honey-voiced Southern belle takes you through the legendary estate of old swivel-hips. But the real fun starts when you ditch the guide and go beyond the velvet ropes. Virtual Graceland's seriously cool virtual reality interface allows you to just wander around. You'll find home movies and interviews with various FOEs (Friends of Elvis), song clips, and an endless parade of all things Elvis. Ambient sounds of people chatting and phones ringing make the experience eerily real—at one point I swear I heard the King call my name. Virtual Graceland avoids the kitsch and concentrates on Elvis, musical legend and family man. Home movies of Elvis with an infant Lisa Marie will warm the coldest heart. Well designed and boasting an intuitive interface, Virtual Graceland is a beautiful thing. Much like the man himself. Sniff. —*Glenn McDonald*

LONG LIVE THE KING: Elvis lives on in Virtual Graceland, which lets you wander through the famous estate.

Virtual Graceland

GRADE: **A**; PRICE: $50 street; Highway One Media Entertainment; 888/358-4723; www.virtualgraceland.com

READER SERVICE NO. 628

MY MOTHER, MY PIM

EVER WISH YOUR mother were still around to manage your schedule? Well, **CyberMom**, a personal scheduler that comes packaged like a box of Tide, may be as close as you're going to get. A Tip of the Day reminds you of life's essentials ("Always go to the bathroom before you leave the house"). You schedule appointments, then set alarms using the Nag-o-Meter. You can also attach sticky notes to your desktop. Alas, unlike mom's cookies, this product is only half baked. There's a to-do list, but no address book. Want to set up monthly PTA meetings? Fahgeddaboutit. This is clearly a novelty product, not a serious scheduler. Spend your money on your real mom instead—she'll take better care of you. —*Daniel Tynan*

CyberMom

GRADE: **D**; PRICE: $24.95 list; Digital Entertainment; 800/728-4000; www.cybermom.com

READER SERVICE NO. 629

SAT SMARTS

MTV ON A CD-ROM? With its slick graphics and hip teenage guides, you might think so. But no, it's **Acing the New SAT.** In their efforts to be cool, the designers forgot their goal: to provide guidance for the SAT. After you drag yourself around the first three levels, which offer fluffy test-taking tips and boring lectures, you finally get to the meat: sample tests that are really helpful. The feedback you get there is more useful than any of the earlier lectures. This product would be much more useful—though less hip—if the MTV image were toned down and more practice exams were provided. —*JoAnne Robb*

Acing the New SAT

GRADE: **C**; PRICE: $45 street; Princeton Teaching Associates Software; 888/728-8887; www.ptas.com

READER SERVICE NO. 630 ■

F Y I

SHOPPING ON the Internet wins the number two position on American consumers' "Wish it was never invented" list. The reason? A fear of giving out credit card information over the Net.

SOURCE: CONSUMER MIND READER SURVEY IN *PREDATORY MARKETING* BY C. BRITT BEEMER

KEEPING UP

What's On Tonight?

THE ETERNAL QUESTION for channel surfers is, What's on? Now your Web surfing can help your channel surfing get focused. At www.clicktv.com you can search the TV listings in your area to find what basketball team is playing this weekend, if there's a Jerry Lewis movie on after midnight tonight, or whatever makes you grab for the remote.

Cheap, Easy Book Shopping

LOOKING FOR a good book to read? Barnes & Noble (www.barnesandnoble.com) recently launched a shopping site that has more than deep discounts on all books (20 percent off all paperbacks and 30 percent off all hardcovers). You can search the Barnes & Noble inventory of 400,000 titles by all kinds of criteria, like author, category, new titles, and best-sellers. But the site will also recommend books it thinks you'll like. Tell it what books you've loved and hated. It compares your reviews to reviews by other readers, and suggests books that people with similar responses have recommended.

Impulse Software

NO TIME to shop for software? Soon you'll be able to pick up the latest disks along with life's other necessities at the supermarket—right next to the videos, flowers, and books. Dallas-based Major Connections is pushing the trend by handling software selection, distribution, placement, and promotion. So far the company has signed up publishers like The Learning Company, 7th Level, and Graphix Zone and chains like Grand Union in the Northeast and Vons in California.

Dream Vacations

YOU GET ONLY so many vacation days a year. But you can dream about vacations all year round. For that purpose, Salon magazine (www.salonmagazine.com) has launched a new travel section, Wanderlust. Notable writers—Isabel Allende, Peter Mayle, and others—will offer articles about experiences lived on the road. —Christina Wood

ILLUSTRATIONS: ROBERT KOPECKY

The DIAMONDTRON advantage is now even bigger, sharper and clearer.

Introducing the world's first .28mm, 21-inch (19.7" DVI*) aperture grille monitor.

The new Diamond Pro 91TXM (21" CRT/19.7" diagonal viewable image) from Mitsubishi Electronics represents an unprecedented improvement in the way you'll look at monitors from this moment on.

MITSUBISHI DIAMONDTRON™ CRT TECHNOLOGY

Bright, vivid colors with superb contrast. Razor-sharp focus due to Mitsubishi's enhanced electron gun. High refresh rate for flicker-free imagery. On-Screen Display system with intuitive front-panel controls. All in an ergonomic, compact enclosure that fits easily into any workspace.

Best of all, the Diamond Pro 91TXM is available at the estimated selling price of $1,649, including a comprehensive 3-year warranty and support program to keep it working at peak efficiency. The new Diamond Pro 87TXM (17" CRT/16.0" diagonal viewable image) is also available, with an estimated selling price of $829.

Get all the details today—both on-screen and off—by calling Mitsubishi Electronics at **1-800-843-2515** in the U.S. and Mexico. In Canada call **1-800-387-9630**. *For immediate product specifications call Mitsubishi Qwikfax at* ***1-800-937-2094***. World Wide Web http://www.mitsubishi-display.com

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Circle 155 on reader service card

PC WORLD

TOP 5 HOME PCs

	SYSTEMS	Street price (4/1/97)	Overall rating	PC WorldBench score	Reliability/ service rating	Setup rating	Comments	Reader service number
1	Dell Dimension XPS M166s 800/388-8542 www.dell.com	$2349	90	223 outstanding	best/ best	fair	**FEATURES:** Pentium MMX-166, 32MB of SDRAM, 4GB hard drive,12X CD-ROM drive, 33.6-kbps fax-modem, 15-inch monitor. **PRO/CON:** Reasonably priced and loaded with hardware. Faster than some Pentium MMX-200s. Includes Microsoft Office Small Business Edition, but no other software. Mail-order only. Good home-office foundation.	640
2	HP Pavilion 5320 800/724-6631 www.hp.com/info/pchome1	$1848	86	180 good	best/ good	outstanding	**FEATURES:** Pentium-150, 16MB of RAM, 1.6GB hard drive, 8X CD-ROM drive, 33.6-kbps fax-modem, 15-inch monitor. **PRO/CON:** HP's lowest-price, entry-level machine but lacks power for high-end multimedia titles. Software bundle includes Works, Encarta 97, Quicken SE, Hansel and Gretel, Great Word Adventure, and Magic School Bus.	641
3	HP Pavilion 7370V 800/724-6631 www.hp.com/info/pchome1	$2948	85	222 outstanding	best/ good	outstanding	**FEATURES:** Pentium MMX-200, 32MB of RAM, 4GB hard drive,16X CD-ROM drive, 33.6-kbps fax-modem, 15-inch monitor, game pad, 3-D video card with 4MB of RAM. **PRO/CON:** Super muscle machine, perfect for serious gamers, but somewhat expensive. Includes Mech Warrior 2 for MMX, Whiplash, SimCity 2000, and MS Works.	642
4	HP Pavilion 7350P 800/724-6631 www.hp.com/info/pchome1	$2748	84	200 good	best/ good	outstanding	**FEATURES:** Pentium MMX-166, 32MB of RAM, 2.5GB hard drive,16X CD-ROM drive, 33.6-kbps fax-modem, 17-inch monitor, built-in color scanner. **PRO/CON:** Great machine if you like to work with video, photos; expensive if you don't need image-editing software or scanner. Includes Adobe Photo Deluxe, Kai's Power Goo, and EasyPhoto.	643
5	IBM Aptiva C8E 800/426-7235 www.pc.ibm.com	$2398	82	212 very good	fair/ good	outstanding	**FEATURES:** Pentium MMX-166, 32MB of SDRAM, 3.1GB hard drive, 16X CD-ROM drive, 33.6-kbps fax-modem, 15-inch monitor. **PRO/CON:** Suitable for family fun and education. Affordable, but IBM's reliability rating has taken a downward turn (see Top 20 for details). Includes Lotus SmartSuite, Quicken SE, and Tuneland.	–
	Best Buy						All products:	904

HOW WE TEST The overall rating is based on reliability and service (30 percent), price (20 percent), PC WorldBench performance (20 percent), setup (10 percent), compatibility (10 percent), and extra features (10 percent). Reliability and service ratings are based on results of PC World's reliability and service survey.

SURPRISE, SURPRISE. For the eighth time in as many months, a Dell computer is at the top of the chart. And not too far behind Dell's lead are the three Hewlett-Packard machines that trailed Dell's system last month. So what's the news? We've got one new machine from Big Blue: IBM's Aptiva C8E.

Why is it so hard to knock the Dell and HP machines from the Top 5? One simple reason: reliability and service ratings. These two companies not only offer speedy home systems (compared to other home machines), but the companies that make them do well in our ongoing reliability and service survey.

The Dell Dimension XPS M166s—at number one for the second month in a row—has a killer combination of high speed and low price. Its one fault: You get only one software package, the useful Microsoft Office Small Business Edition. But at $2349, you can't go wrong.

Behind the number one machine are three in a row from HP—all easy to set up and loaded with software. At number two, costing $1848, the Pavilion 5320 is a bargain for anyone with average computing needs. But its poky PC WorldBench score can't keep up with the latest MMX PCs.

If playing games is your real motive for wanting a new computer system, the third-place HP Pavilion 7370V is a better choice. But despite a recent $200 price drop, it's still a tad expensive at $2948.

If you yearn to scan, edit, and distribute your photo album, then HP's Pavilion 7350P, with a built-in color scanner, is for you. A recent $300 price drop pushed it up a notch to number four. But at $2748, it still doesn't come cheap

The news this month is IBM's Aptiva C8E at number five. The C8E is speedy, affordable (at $2398), and loaded with choice software. Its MMX processor and ATI Rage II 3D chip give it enough power to handle demanding multimedia titles.

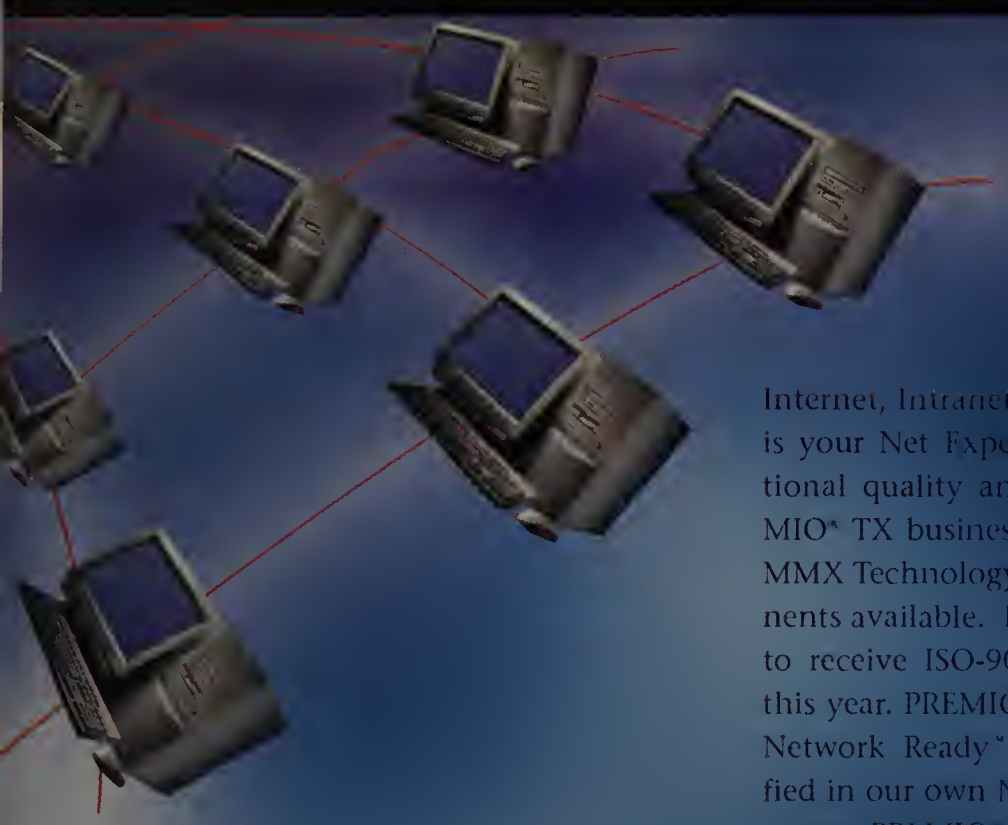
We also looked at new systems from Quantex and CyberMax that didn't make the Top 5. Quantex's QP6/200 SM-2 is a Pentium Pro that scored a PC WorldBench rating of 225 and costs only $2399. For the same price, CyberMax's Pro Max 3 delivers thoroughbred speed (a 230 PC WorldBench score) and sports a built-in 5-by-7-inch color scanner.

—*Kirk Steers*

IBM'S APTIVA C8E comes with software titles designed for MMX.

Kirk Steers is a contributing editor for PC World. *Testing performed by Ulrike Diehlmann of the PC World Test Center.* ■

ILLUSTRATION: JEFFREY PELO



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THE POWERVR REVOLUTIONARIES

INTERVIEW

DIVA LA REVOLUCIÓN

Tomb Raider's Fiery Lara Croft is one of the most recognized figures of the PowerVR™ Revolution. A confrontationalist, she has grown tired of the old 3D Order. With passion and anger, Lara has been relentlessly fanning the flames of revolutionary justice for gamers around the world.

WELCOME TO THE MOVEMENT. APPARENTLY, DISCOVERING ANCIENT TOMBS HAS FAILED TO SATISFY THE RADICAL HUNGERS THAT GNAW AT YOUR SOUL?

Lara Croft My first passion will always be exploring ancient civilizations. But when I realized gamers were being kept down by inferior 3D technology, I went balistic. I'm busting my arse to get gamers the 3D experience they deserve.

SO THE BLAND 3D EXPERIENCE WAS BOUND TO PRODUCE A REVOLT?

L: Absolutely. But this is an armed struggle, love. And the weapon is not the Colt .45 in my hand. It's the PowerVR 3D technology that will topple the bloody awful 3D experience.

ARE YOU SAYING EVERYTHING ABOUT CONVENTIONAL 3D TECHNOLOGIES DESERVES TO PERISH—SHOVED OFF TO THE ASH HEAP OF OBSOLESCENCE?

L: Bloody right, mate. Gamers want 3D technology that liberates their experience. Like higher resolution. Higher frame rates. Effects that take them as close to reality as you can get.

LIBERATION SEEMS TO BE A CENTRAL THEME DRIVING THE MOVEMENT.

L: Look, if I could escape the suffocating arrogance of snooty British society, gamers could overthrow the forces trying to smash the PowerVR resistance. That's what pumps adrenaline through my body.

UM, DON'T TAKE THIS THE WRONG WAY LARA, BUT THAT'S SOME BODY.

L: Actually, you should see it at 800x600 resolution. I think you'd dig my aerial flips with realistic shadows.

WHEW, WELL, UH...SO LARA, THESE ARE EXCITING, TURBULENT TIMES. GAMERS AND GAME DEVELOPERS SEEM TO BE GETTING SWEPT UP IN THE PROMISE OF POWERVR.

L: That's right. Our freedom fighters are developing games right now that are PowerVR Ready. Eidos, Kalisto, Shiny, Sega Entertainment, FASA, Activision, Core Design, Gremlin. All feverishly churning out PowerVR Ready titles, including my next adventure, Tomb Raider 2.

WOULD YOU SAY THE MOVEMENT IS OBSESSED WITH POWER?

L: Of course, you twit. Frankly, we're not stopping until we have profoundly altered 3D reality for all gamers. And we will! Because we have finally seized the ultimate apparatus of real 3D power.

THE POWERVR TECHNOLOGY?

L: Yes. And with it, there will be no obstacles that can stand in the way of the mission of the PowerVR revolution: to produce the most realistic game experience imaginable. Now bugger off, I've got a battle to fight.

Tomb Raider

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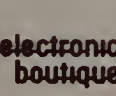

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Sizzling CPUs and Other Horror Stories

WHEN I WAS in grad school, I owned a VW bus—a great car! On long trips I could wrap cinnamon buns in aluminum foil and heat them in the engine compartment. What's good for cinnamon buns, though, isn't good for my CPU.

I found this out the hard way recently when my computer started acting weird. I'd be writing a column, and out of the clear blue the system would lock up. Or it would simply start acting erratically—programs would stall for a minute and then start working again. (Therapy was out of the question; the problems seemed too bizarre.)

I did all the standard things—looked for viruses, ran Scandisk, and tried a few diagnostic programs. No luck—everything checked out A-OK.

I posted a message to the technical jocks on *PC World*'s CompuServe forum (Go PCTECH). These folks have answered dozens of my arcane computing questions with witty, on-the-money answers. (If you have access to CompuServe, try it—the forum is free.) The problem, they said, sounded like some hardware component going south, a bad SIMM, or maybe a heat problem.

So I stuck my head under the computer's hood. Bingo! The cooling fan on top of the CPU wasn't working. My CPU was hot enough to warm a cinnamon bun.

A computer's biggest enemy is sizzling temperatures. I did a little research and learned that according to Intel, a CPU shouldn't get any hotter than 90 degrees Celsius (roughly 190 degrees Fahrenheit). Intel also said that for every rise of 10 degrees Celsius above the operating range, the mean time between failures is cut in half. With the fan broken, my CPU's life span was starting to look shorter than most of my summer vacations. (If you don't believe me, look for yourself: developer.intel.com/design/pentium/applnots/241575.htm.)

> My **CPU** was **hot** enough to warm up my morning **cinnamon bun.**

KEEPING COOL

THERE WAS NO question I had to replace that fan quick. But no way did I want another chintzy fan; I had to have the Cadillac of fans.

I talked with the people at PC Power & Cooling, the company that's famous for power supplies. They also sell fans, and they sold me one: a $22 CPU-Cool 1.9W. The fan is integrated into a die-cast heat sink, and the company says it will keep my CPU at a comfortable 90- to 120-degrees Fahrenheit. (Unfortunately, I have no way of testing that claim.) The CPU-Cool also uses ball bearings rather than sleeve bearings and is warranted for five years. Besides, the CPU-Cool *looks* a heck of a lot more reliable than my old fan.

Pulling out the old fan, disconnecting it from the power lead, and installing the new one was a satisfying, 10-minute job.

COOL ME DOWN

OKAY, CALL ME paranoid, but I wanted an extra cushion of safety—two, actually.

For another $22, I picked up PC Power & Cooling's 110 Alert heat alarm. This little gizmo connects to a spare power lead. If the inside of my computer's case goes above 110 degrees Fahrenheit, a loud, obnoxious alarm sounds, alerting me and causing the dog to bolt from the room.

It gets cooler: I picked up T.S. MicroTech's $22 FanCard II, a slim expansion board with two fans. It takes up a 16-bit slot on the system board and keeps the air circulating. It needs only 5 watts of power, and installation takes no time or skill.

Feeling *really* concerned? Consider Macrotron's $99 HeatSentry, an 8-bit ISA add-in card that monitors your system's insides with two heat probes. If your PC gets hot under the collar while you're away, the card will dial your modem and page you (though it won't help you explain to your date why your computer needs you *right now*).

The moral? Keep your computer cool and warm your buns in the microwave (unless you have a VW bus).

110 Alert, CPU-Cool 1.9W

$22 list each; PC Power & Cooling, 800/722-6555; sales@pcpowercooling.com, www.pcpowercooling.com

READER SERVICE NO. 637

FanCard II

$22 street; T. S. MicroTech; 800/959-9419; www.fancard.com/

READER SERVICE NO. 638

HeatSentry

$99 list; Macrotron Systems Inc., 510/683-9600; www.macrotronusa.com

READER SERVICE NO. 639

PC World *Contributing Editor Steve Bass is a licensed marriage and family therapist and the president of the Pasadena IBM Users Group. He can be reached on PC World Online.* *See page 14 for contact information.* ■

ILLUSTRATION: ROBERT KOPECKY

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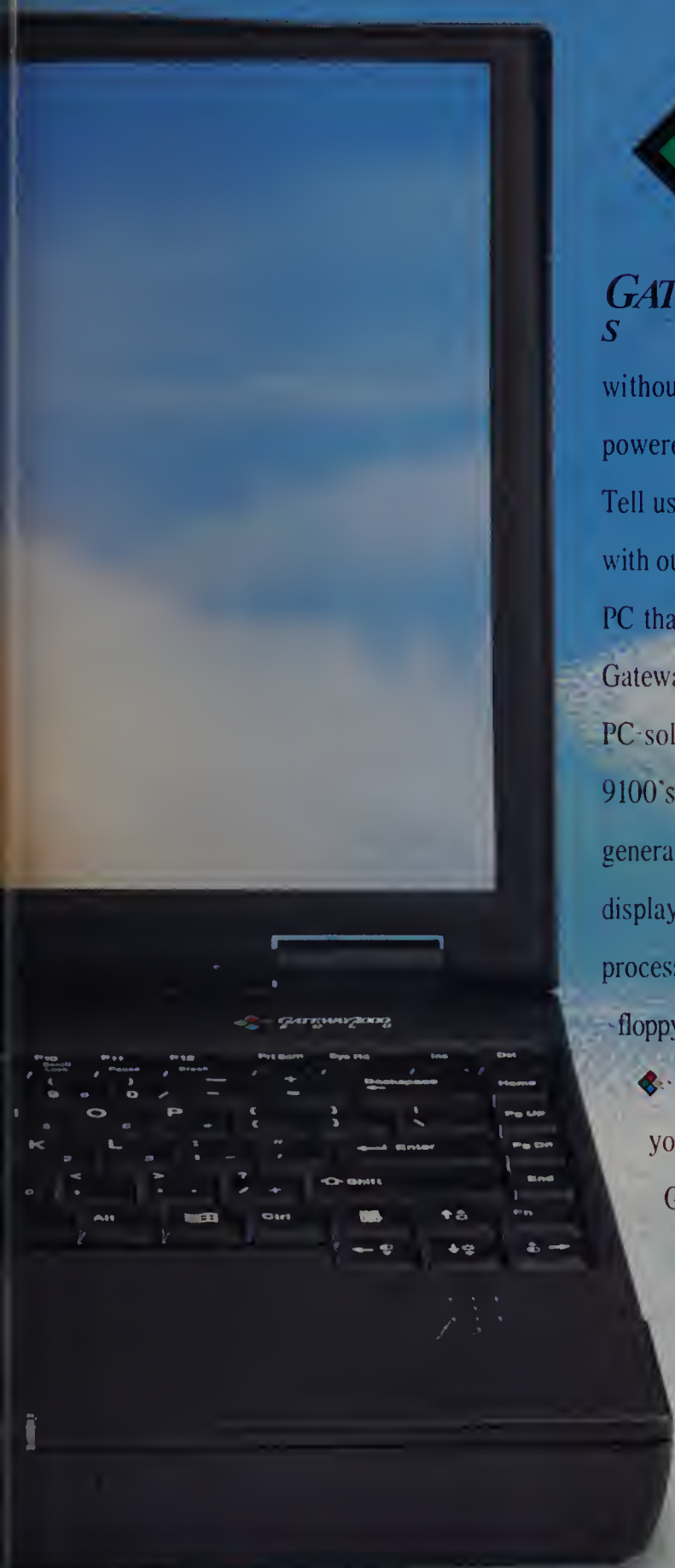

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HERE'S HOW

ANSWER LINE

Can Your System Handle Windows 95 or NT?

I'VE BEEN RELUCTANT to upgrade from Windows 3.1 to Windows 95, partly for fear that my PC couldn't handle the burden. I'm finally ready to make the move, but I'm wondering whether I should leapfrog over Windows 95 and go straight to Windows NT 4.0. Is there an easy way to see how well my PC would handle Windows 95 or NT?

Joan Meldahl, Cleveland

WINDOWS 95 and Windows NT 4.0 require about the same amount of system resources. However, NT doesn't support as many hardware devices as Windows 95 does, and either environment could be too much for an older system.

To check out your PC's readiness, call on a pair of free Microsoft tools. The Windows 95 System Check (available at www.microsoft.com/windows/windows95/info/w95pcready.htm) checks processor speed, memory, and hard disk space. It also checks for installed applications that are incompatible with Windows 95, although it doesn't tell you whether your system is Plug and Play.

The weightier Microsoft Compatibility Tool version 1.0 for Windows NT 4.0 (see **FIGURE 1**) reports on your PC's ability to run Windows NT Workstation or Server. It also tells you which of your installed boards and peripherals are on the Hardware Compatibility List. You can download the tool from www.microsoft.com/kb/articles/q163/0/03.htm. In Explorer, double-click **ntcomp.exe** to decompress its contents, then run **setup.com**. You'll need two floppy disks to run the test.

FIGURE 1: BEFORE YOU UPGRADE to Windows NT, use Microsoft's Compatibility Tool to make sure your system can handle NT.

SEND FILES TO THE RECYCLE BIN FROM DOS

I USE MY DOS PROMPT instead of Win 95's Explorer to copy and delete files. But sometimes I accidentally delete files that I didn't want to lose. I'd like to be able to send files to the Recycle Bin from the command line so that I can recover a file sent there by mistake. How do I do this?

Django Dunn
Vancouver, British Columbia

UNLESS YOU DISABLE the Recycle Bin (in its Properties sheet, select *Do not move files to the Recycle Bin*), when you delete a file from Explorer or a 32-bit application's File Open dialog box, it's moved to a hidden folder named Recycled on the same drive.

If that were all that happened, you could write a batch file that does the same thing and replaces the DOS del command. But simply moving files to the Recycled folder isn't enough. They don't show up in the Recycle Bin's display, and they aren't deleted when you empty the Recycle Bin.

To get a DOS prompt del command, download T.N.C. Venkata Rangan's excellent delete.exe freeware utility from PC World Online. Delete.exe accepts all the command-line switches in Win 95's and NT's del commands, but it engages the Recycle Bin the way the command should.

Even better, if you own Norton Utilities

ILLUSTRATION PETER COATES

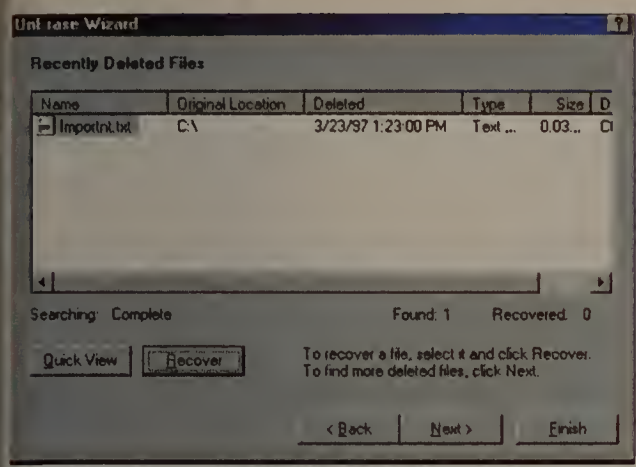


FIGURE 2: EXTEND RECYCLE BIN'S safety net to DOS with Norton Utilities' UnErase Wizard.

for Windows 95, use its Protected Recycle Bin/UnErase Wizard (see **FIGURE 2**) to extend the Recycle Bin protection to the DOS prompt. It also tracks files deleted within applications (including those that don't send a copy to the Recycle Bin).

Norton Utilities 2.0 for Windows 95 $80 street; Symantec; 800/441-7234; www.symantec.com

READER SERVICE NO. 667

UNLOCK POLICY EDITOR

AFTER READING about Windows 95's System Policy Editor in *PC World* recently ("Undocumented Secrets: 101 Tips for Windows 95, NT, and 3.*x*," tip 87, March), I decided to try it to protect my Windows configuration. I enabled the Program Restriction setting and exited Policy Editor to see what effect it had. Guess what? I can no longer run any programs, including System Policy Editor and the Registry Editor. How can I undo this setting?

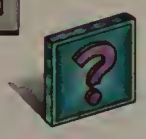
Steve Reinisch, Ottawa, Ontario

OUCH! Fortunately for you, Windows 95's security is like Swiss cheese. Choose *Start•Shut Down•Restart the computer,* and when you see the 'Starting Windows 95' message, press **<F5>** to load Windows in Safe Mode. Safe Mode skips Policy Editor's restrictions and lets you run the program and undo the damage.

For future reference, don't restrict Windows from running apps. But if you have a good reason to do so (to keep the kids from browsing the Web, say), add poledit.exe and any programs you want users to be able to run to the allowed applications list. To do that, run **poledit**, double-click *Local User•System•Restrictions,* and check *Only run allowed Windows applications.* Click *Show,* then *Add,* and enter the executable file name of each program.

To protect your settings, don't install poledit.exe on your hard disk. Run it from the CD-ROM, then hide the disc.

IS YOUR FLOPPY CONTROLLER FAST ENOUGH?



IN HIS FEBRUARY review of backup hardware, "Better Safe Than Sorry," Mike Hogan states that newer computers generally use 1-mbps floppy controllers. He also says that Iomega's Ditto 2GB tape backup drive won't work with the 512-kbps controllers in many older systems. Before I spend $39 on Iomega's 2-mbps Ditto Dash controller, how can I find out the speed of my current floppy controller?

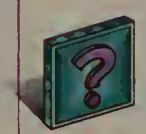
Shirley Birenz, Wyckoff, New Jersey

IT'S NOT JUST older systems that sport the slower floppy controllers. Pentiums may incorporate 512-kbps controllers, while some 486 systems use 1-mbps controllers. On Iomega's Web site, or that of another tape drive maker, you may expect to find free utilities that report your controller's speed—but such is not the case.

Exabyte has the tool you need, a 9.4K DOS program called fdetect.exe. To get it, send a request to support@exabyte.com. You'll get a return message with the program attached in UUencode format. (By the time you read this, Exabyte will probably have posted the utility on its Web site, www.exabyte.com.) If your mail program can't handle UUencoded attachments, you'll need to save the message contents as a file and use a third-party decoder.

Even if you have a 1-mbps controller, you may still want to upgrade. A 2-mbps controller like the Ditto Dash or Exabyte's 2Mbit Accelerator Card will speed up backup and restore operations noticeably.

DUAL-BOOT WITH WIN 95 OSR2



I RECENTLY PURCHASED a system that had Windows 95 4.00.950B installed, the new Service Release 2 available only with new computers. Not about to let an old dinosaur die, I would like to have a setup that will let me boot to either DOS 6.22 or Windows 95.

When I upgraded from Windows for Workgroups 3.11 to Windows 95, DOS 6.22 was included on the disk. As I recall, if I load 6.22 from the DOS setup disks, io.sys, msdos.sys, and command.com will change to 6.22 configuration, and Windows 95 probably won't boot. Is there a way to load DOS 6.22 in a dual-boot configuration with Windows 95?

Mark Phillips, Albany, Oregon ▶

By Scott Spanbauer

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INTERNET

DON'T MISS ADDITIONAL HERE'S HOW information at **www.pcworld.com/hereshow.**

OEM SERVICE RELEASE 2 (OSR2) does not support dual-booting with DOS, which you may still want to do to run DOS games and applications that balk at Windows 95 or Windows 3.1. You can press <F4> during start-up to boot to your old version of DOS, but there's a bug: That's the last time the computer will boot from the hard disk. Better have a Windows 95 Startup disk on hand (choose *Start•Settings•Control Panel•Add/Remove Programs•Startup Disk* to create one).

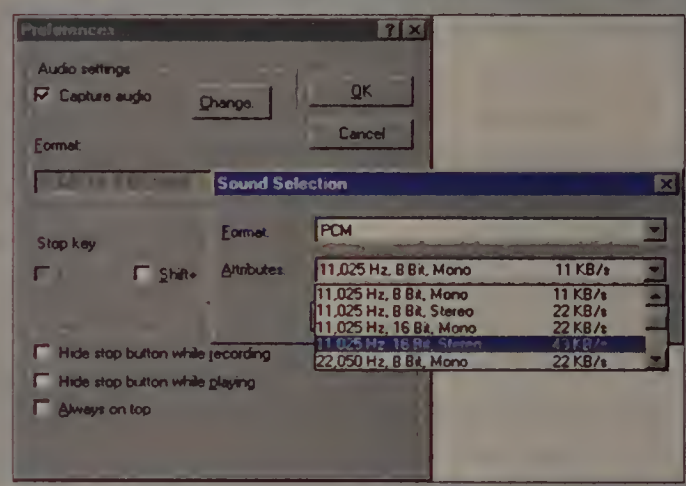
Microsoft says it's working on a fix, but in the meantime, an enterprising German hacker named Joerg Wespe has written a free utility, W95Boot, that makes your system bootable again and gives OSR2 the ability to dual-boot with DOS. You can download w95boot.zip, which contains the program and documentation, from www.tu-chemnitz.de/~jwes/win95boot.html. Unzip the file, copy w95boot.exe to a Windows 95 or DOS 6.*x* boot floppy disk, then boot with the floppy and run the program. The next time you boot up, you'll get the choice you want.

If you just bought a new system and aren't sure whether OSR2 has been installed, here's how to find out. Right-click *My Computer*, choose *Properties*, and click the *General* tab. If it says 'Windows 95 4.00.950' or '4.00.950a' under 'System', dual-boot all you want. If you see '4.00.950B', you'll have to follow the instructions above.

Find files from this article at www.pcworld.com/software_lib/ and more tips at www.pcworld.com/hereshow. Answer Line *welcomes your questions and pays $50 for published items. Contributing Editor Scott Spanbauer is author of* The No B.S. Guide to Windows 95 *(No Starch Press, 1996, 800/420-7240). See page 14 for contact information.* ■

Put Your Screen in Movies

UNTIL NOW, the only way to record on-screen activity for demos or tutorials had been to use Lotus's $100 ScreenCam utility. Microsoft changed all that with a Camcorder tool that captures your screen as an .avi movie or .exe file. The utility is available for free on Microsoft's Web site (www.microsoft.com/OfficeFreeStuff). Compare it with Lotus's ScreenCam97 by downloading a demo version from www.lotus.com/screencam/213a.htm.



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*Winbench 97 Business Graphics test conducted at 1024x768 16bpp mode on a Pentium II 200 system with 64MB SDRAM memory, 512K pipeline cache under Windows 95 using Microsoft certifiable drivers (non-GDI patched).

Circle 5 on reader service card

Stifle the Startup folder ◆ Print a directory list ◆ Manage NT's Task Manager

Stop Call Waiting for Your Voice Calls

MOST PEOPLE KNOW that when they're going online, they can disable Call Waiting on a standard analog line by adding a special code to the beginning of the phone number their modem dials. The most common codes for this are *70, 70#, and 1170. (To find out what code works in your area, consult your local phone directory.)

But Windows also lets you do this for outgoing voice calls to clients or contacts that require uninterrupted conversations.

In Windows 95, start Phone Dialer (select *Start•Programs•Accessories•Phone Dialer*). If you want to disable Call Waiting for all outgoing calls, choose *Tools•Dialing Properties*. You might think that all you have to do is check the box that begins 'This location has call waiting'. But this option affects only modem and fax calls.

To disable Call Waiting for Phone Dialer as well, first uncheck the option (so the code isn't dialed twice). Then in the box that begins 'To access an outside line' type the disabling code followed by a comma (see **FIGURE 1**). The comma causes the dialer to pause for a dial tone before continuing. Use the first box in this line for local calls; add the same code to the second box if you want to disable Call Waiting for all long-distance calls as well.

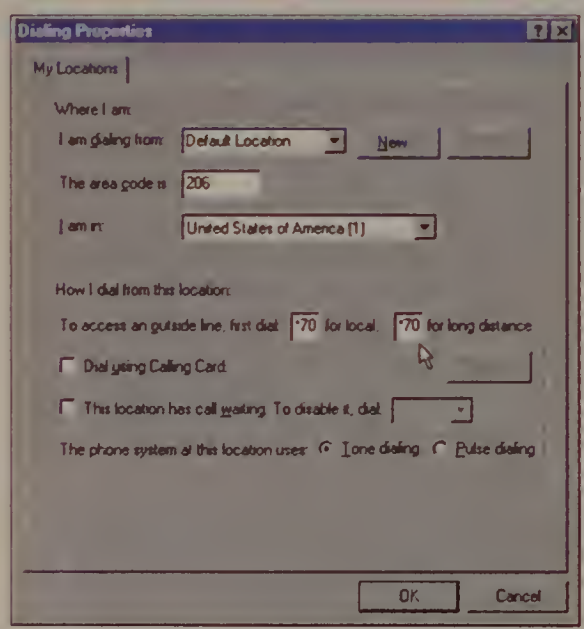

FIGURE 1: TURN OFF CALL WAITING for phone calls and online sessions by entering a code and unchecking the disable option for Call Waiting.

If you want to disable Call Waiting only for certain individuals in your speed dial list, ignore the Dialing Properties sheet mentioned earlier. Instead, start Phone Dialer and choose *Edit•Speed Dial*. Click the button for the Call Waiting status you want to change, and type your disabling code, followed by a comma, at the beginning of the phone number. When you're done, click *Save*.

In Windows 3.x, start Cardfile. To disable Call Waiting for all outgoing calls, choose *Card•Autodial*. Type the disabling code in the Prefix box, followed by at least one comma (see **FIGURE 2**). Check *Use Prefix* and click *OK*. This option will now be turned on for any Cardfile file you open. To disable Call Waiting for certain parties only, don't futz with the prefix option in the Autodial dialog box. Instead, type the disabling code, followed by a comma, at the beginning of the phone number of selected cards in your Cardfile file. Then choose *File•Save*.

One last tip comes from Mike Sharsky of High Point, North Carolina: If the comma at the end of the disabling code doesn't make your dialer pause long enough to get a dial tone, you can increase the length of the pause simply by adding more commas. This trick works for all versions of Windows.

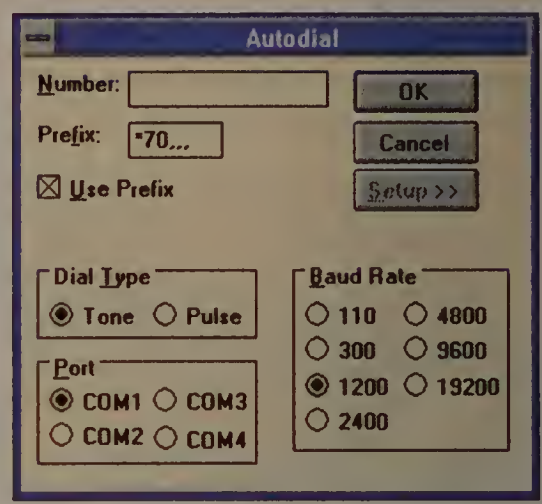

FIGURE 2: DISABLE CALL WAITING from Windows 3.x's Cardfile. To make sure the dialer pauses long enough to get a dial tone, add commas to the disabling code.

STOP STARTUP STUFF, ONE MORE TIME

IN THE FEBRUARY issue, I pointed out that you could suppress the launching of applications in your Startup folder by holding down **<Shift>** as your computer starts. Unfortunately, this has the effect of putting you in Safe mode, a very limited state with no network support, no sound, and primitive video resolution and color.

David Futcher of Kelso, Washington, wrote in with a better idea. If you simply hold down **<Ctrl>** when Windows starts, you can suppress the launching of your Startup folder applications without any of Safe mode's nasty side effects. You don't need to hold the key from the first sign of the Windows 95 Startup logo, either. Just press **<Ctrl>** as soon as you see the Windows 95 hourglass, then wait until Windows finishes starting. Your Startup applications will stay out of your way.

GOING BACK TO YOUR ROOTS

LONG FILE NAMES are great: Carefully used, they make it about 255 times easier to figure out what's in all those files on your system. But make sure to keep them out of the root directory (folder) of each drive on your computer.

Most hard disks permit only 512 directory entries in the root directory. This may seem like plenty, but the number is misleading. That's because long file names occupy more than one directory entry—one for the short file name equivalent (eight characters plus a three-letter extension) plus any successive entries needed to store the long name. If you have a lot of folders in the root directory, each with a long file name, you can soon run into the 512 limit. (You don't have to worry about this limit, though, for objects you put in directories other than the root.) ▶

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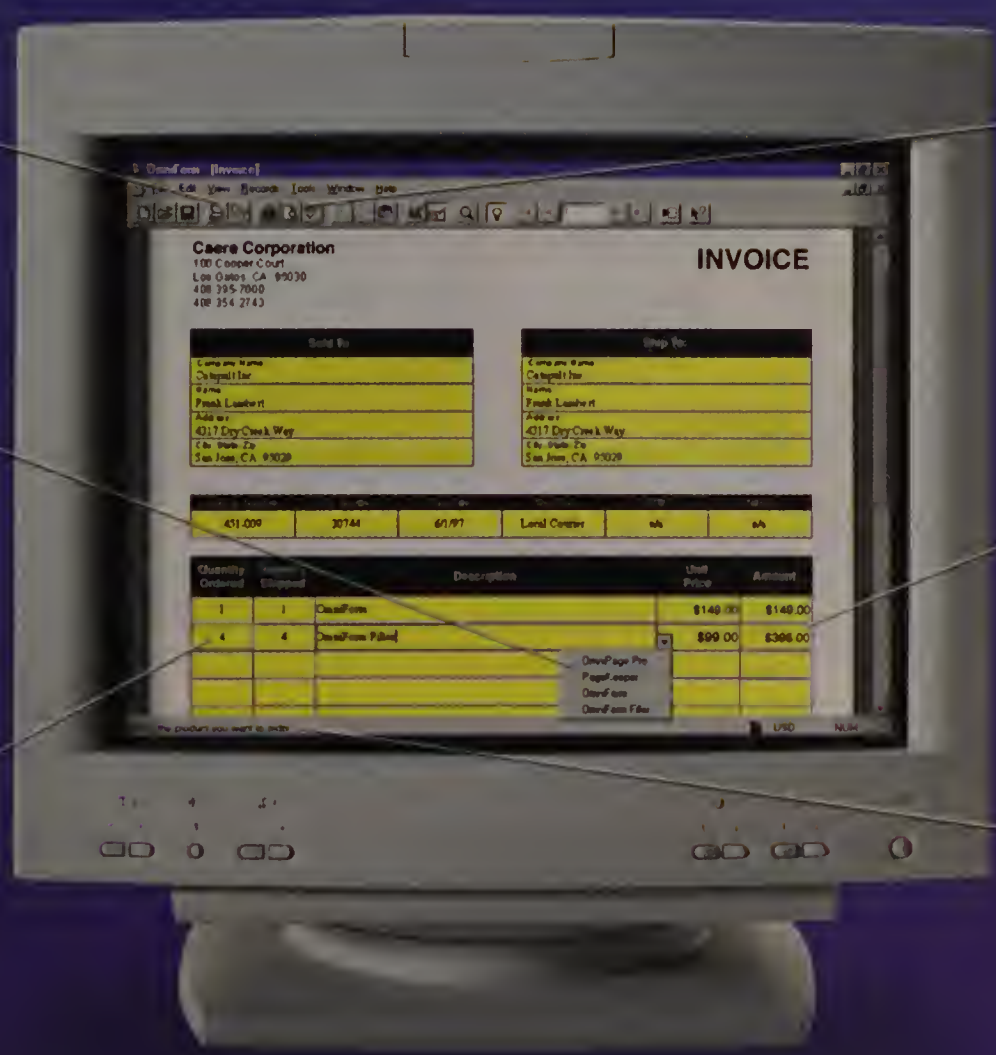

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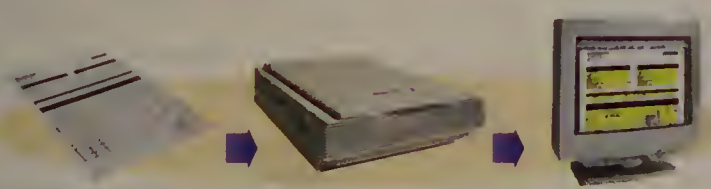

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Circle 91 on reader service card

You might think the solution would be to name all files and folders in your root directories with short file names. But even that approach may not work, because Windows 95's file names are case sensitive. For example, if you create a folder named SalesDoc (or even Salesdoc), you're still taking up two directory entries—one that stores the DOS equivalent, and one that stores the version with the uppercase and lowercase letters.

To be sure you're not taking up unnecessary directory entries, do this: In Windows Explorer, choose *View•Options*. Make sure the *View* tab is in front. Uncheck the box *Hide MS-DOS file extensions for file types that are registered* (if necessary) and click *OK*. This step ensures that you rename an entire file, not just the part before the extension. Then in your root directory, select a file or folder (but not the Program Files folder or any other folder that contains programs) and press **<F2>**. Type a short name for the folder in all uppercase letters, and press **<Enter>**. The folder name will reappear in lowercase except for the first letter and will occupy only a single directory entry.

To confirm that you've really eliminated extra directory entries, open a DOS window, type **cd**, and press **<Enter>** to get to the root directory. Then **type dir /p** and press **<Enter>** again. Examine all the file names on the left and right sides of the list (see **FIGURE 3**). If each name on the left has the same capitalization and length as its corresponding name on the right, you know it is using only one directory entry. Press **<Space>** to continue the directory listing; repeat this examination until you've looked over all the items in the root.

Finally, return to Windows Explorer, choose *View•Options*, and restore your preferred setting for hiding extensions.

Of course, there are other reasons to keep your root (or any folder) clean: It's a lot easier to find files if you sort them into a logical hierarchical structure rather than overloading one folder with hundreds of files.

BOOT TO NOWHERE

EVERYONE knows it's a good idea to keep a bootable floppy disk (also called a boot disk or a system disk) handy in case your computer fails to boot from its hard disk. To make a floppy disk bootable, you simply format it with the System option.

To do this in File Manager, just choose *Disk•Format Disk*, check *Make System Disk*, insert a disk into the appropriate drive, and click *OK*. Or, if you already have a blank, formatted disk, insert it into your floppy drive, choose *Disk•Make System Disk*, and click *Yes* to confirm the transfer of system files.

Unfortunately, as M. L. Giggleman of Dallas points out, if you have compressed your hard disk with DoubleSpace or DriveSpace, you're in for a disappointment when you try to boot from this disk: Your computer won't be able to see the compressed files because File Manager's Make System Disk option doesn't transfer the files that it needs in order to see them. What used to be your C: drive may now appear only as a huge, unreadable dblspace.ooo file (if you can see it at all, since it's a hidden file). You'll be able to access only the uncompressed files on your system, which is not very useful.

To solve this problem for an existing system disk you have lying around, use File Manager to navigate to your DOS directory, locate either dblspace.bin or drvspace.bin, and drag the file to the floppy icon on the drive bar to copy the file to your system disk. (Choose *Options•Drivebar* if you don't see the drive icons.) If you're making a whole new system disk, double-click *MS-DOS Prompt* in Program Manager. At the DOS prompt, type **format a: /s**, insert a new floppy disk, and press **<Enter>**. (The /s switch tells DOS you want a system disk.) Unlike File Manager, DOS will format the disk with the necessary DoubleSpace or DriveSpace file as well as the system files you need to boot from your floppy.

Now copy any backup files, disk repair, and antivirus software you think you'll need—for example, config.sys, autoexec.bat, system.ini, and win.ini, plus device drivers loaded in config.sys and autoexec.bat. Then put the disk in a safe place—and hope you never have to use it.

```
MS-DOS Prompt
10 x 18
(continuing C:\)
PIX            <DIR>        02-17-94 10:56p PIX
PROGRA~1       <DIR>        06-01-95 12:58p Program Files
WINDOWS        <DIR>        12-31-93  4:03a WINDOWS
AUTOEXEC OLD          801   08-25-95  7:38p Autoexec.old
AUTOEXEC BAT          284   02-09-97  9:30a AUTOEXEC.BAT
AUTORUN  EXE       13,073   01-01-92  1:10a AUTORUN.EXE
AUTORUN  CFG           18   02-17-94  8:18a AUTORUN.CFG
CHJOY3   EXE       33,354   09-28-90  9:16a CHJOY3.EXE
Press any key to continue . . .
```

FIGURE 3: REMOVE EXTRA DIRECTORY entries from long file names and from short file names with internal capitalization. Matching names on the left and right sides of the DOS listing indicate a single directory entry.

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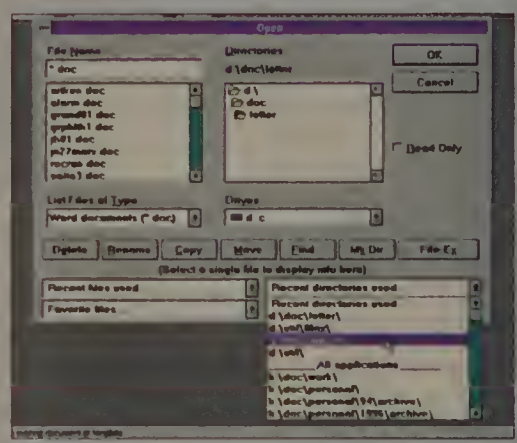
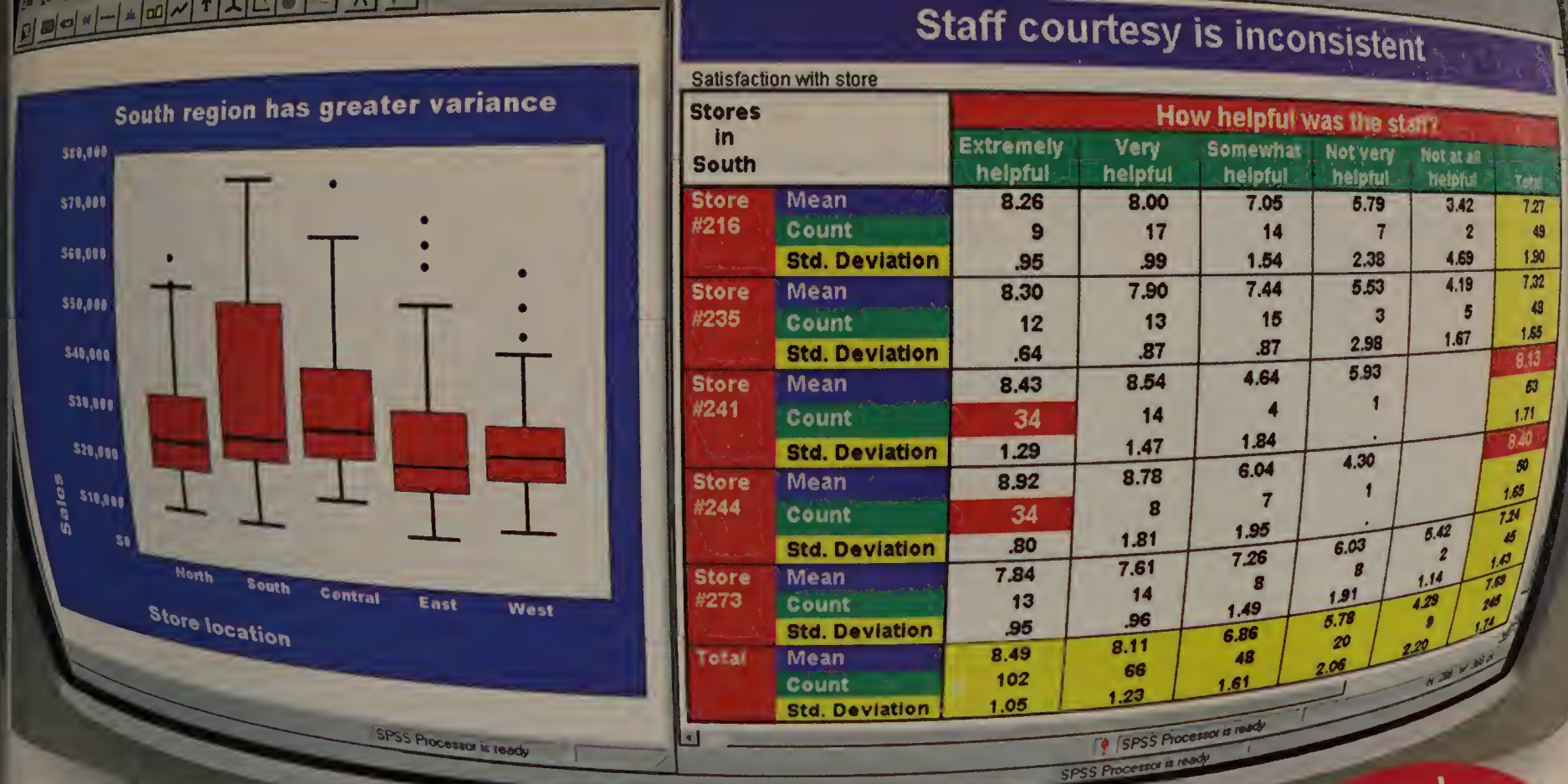


PRINT DIRECTORY LISTS

I'M A FORMER Mac user who misses being able to print a list of folder contents with descriptions, file size, and so on. Can I print the contents of a directory (folder) in Windows?

John Tarquinto, Toledo

BELIEVE IT OR NOT, Microsoft has consistently omitted this useful feature from Windows. Luckily, it's easy to add a Print Directory command with a simple ▶



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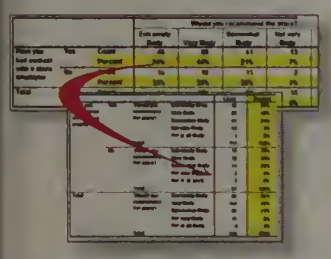

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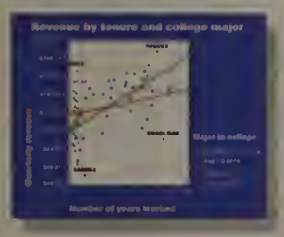

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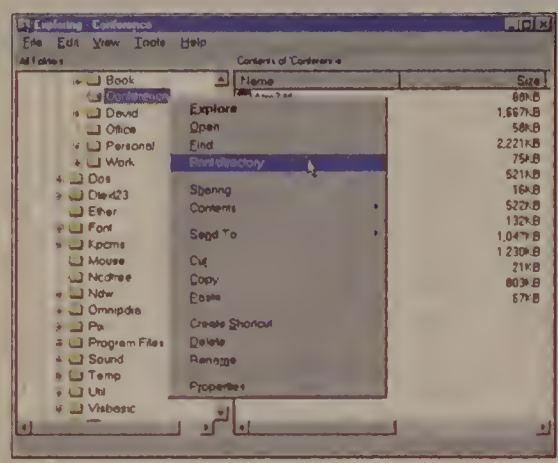


FIGURE 4: WITH A SIMPLE BATCH FILE, add this Print Directory command to the menu.

two-line batch file, although be aware that this technique does not work with PostScript printers.

Because this batch file contains a special character, you need to create it at the DOS prompt instead of using Notepad. Open a DOS window and switch to the directory where you want to store your batch file (for example, you might type **cd c:\windows** and press **<Enter>**). At the DOS prompt for that directory, type **copy con pdir.bat** and press **<Enter>**. Next, type **dir > lpt1** (if necessary, replace this last item with the port to which your printer is connected).

If you want to customize the directory listing, add command-line switches after the word *dir* in this line (for example, add **/og** to make the directories appear at the top of the listing).

When the line looks right, press **<Enter>**. Now type **echo** followed by a space, and then press **<Ctrl>-L**. (This will look like ^L on screen, but it is not the same as typing a caret and a capital *L*.) Type another space, and then type **> lpt1** (again, your printer port may differ). Press **<Enter>**. This line will cause your printer to eject the page once your directory listing has finished printing. Finally, press **<Ctrl>-Z** and then press **<Enter>** to save these commands to the batch file. You can now close the DOS window.

To set up your batch file so that it runs easily in Windows 95, start Windows Explorer and choose *View•Options*. Click the *File Types* tab and select *File Folder* (not Folder) from the list of Registered file types. Click the *Edit* button. In the Edit File Type dialog box, click *New* to create a new action. In the 'Action' box, type something like **Print directory**. In the 'Application used to perform action' box, type **c:\windows\pdir.bat** (adjust the path as needed). Then click *OK* and close each of the remaining dialog boxes.

Now right-click a folder in Explorer's left pane, and choose *Print directory* from the resulting menu (see **FIGURE 4**) to test your new command. (If you right-click a folder in the right pane, the printed list will show only the contents of the folder containing the folder you clicked.) When the batch file is finished, you'll see a DOS window open on your screen; if instead you see a DOS prompt displayed full-screen, press **<Alt>-<Enter>** to make it a window.

To keep this window out of the way in the future, click its control menu icon (at the far left end of the title bar) and choose *Properties* from the menu. From the *Run* drop-down list in the resulting dialog box, select *Minimized*. Then check *Close on exit* and click *OK*. Close the DOS window. From now on, you won't have to fuss with the DOS window whenever you run your new Print directory command.

To use the batch file in Windows 3.1, you have to do a little typing each time. Start the Windows File Manager and select a folder in the left pane. (As in Windows 95, if you select a folder in the right pane, the list will show the directory containing the selected folder.) Choose *File•Run*. Press **<Home>** to move the cursor to the beginning of the Command Line. Type **pdir** (or whatever you named your batch file), followed by a space, leaving the directory name at the end of the command line. Then press **<Enter>**. (If that seems like too much typing, you can easily automate most of these steps with a Windows Recorder macro.) The DOS window will flash on your screen, but it should close automatically as soon as the batch file has finished running.

Find files from this article at www.pcworld.com/software_lib. Windows Tips welcomes your tips and questions and pays $50 for published items. Contributing Editor Scott Dunn is a principal author of The PC Bible, 2nd Edition *(Peachpit Press, 1995, 800/283-9444). See page 14 for contact information.* ■

Take Windows NT to Task

WHAT NT UTILITY lets you launch, close, and switch between apps; tile, cascade, and minimize all open windows; and get more data about system activity and performance than you'd ever want? It's the Task Manager built right into Windows NT.

To open the Task Manager, right-click on the Taskbar and choose *Task Manager* from the menu. Here are some highlights:

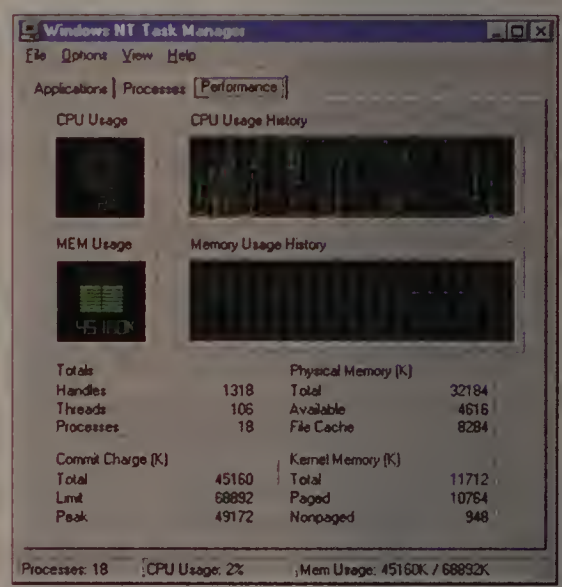
Start, stop, switch. Click the *Applications* tab to switch to a running application, terminate one, or open a command line.

Window dressing. Click the *Windows* menu to arrange the windows of running programs or get them out of your way by minimizing them.

Low profile. To keep Task Manager out of the way, uncheck *Always On Top* on the *Options* menu. Or check *Minimize On Use* and *Hide When Minimized* to keep Task Manager off the screen when you press **<Alt>-<Tab>** to switch between applications. You can get it back by double-clicking its icon in the notification area.

Follow the process. Click the *Processes* tab to get information on current operations. To select the data to be shown, choose *View•Select Columns* and check the items you're interested in. If you select more columns than fit in the default window, you can resize Task Manager by dragging any edge.

Command performance. For a graphical summary of current system activity and performance (as in the figure below), click the *Performance* tab. To see how much the operating system is using your CPU, choose *View•Show Kernel Times* to add a separate indicator (marked in red).



HOW'S MY DRIVING? Windows NT's Task Manager makes it easy to monitor current system performance.

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Excel 97 Hyperlinks Tame Large Worksheets

NAVIGATING WITHIN a complex spreadsheet has always been difficult despite features like the Edit•GoTo command, range names, sheet tabs, and macros. But Excel 97's versatile new hyperlink feature, ordinarily used to link to Web-based HTML or spreadsheet documents, may change that.

Suppose you have a workbook named projectlink.xls. Its top sheet, named Summary, contains a list of expense totals. You'd like to click the value for Project X and see the expense details (see **FIGURE 1**).

	A	B
1	**Expense Category**	**Amount**
2	General R&D	$2,589,500
3	Project X (click for detail)	$204,777
4	Other	$500
5	**Total**	$2,794,777

	A	B	C	D
1	**Item**	**Amount**		
2	Wrench	$123,456		
3	Flange	$78,901		
4	Pipe	$2,345		
5	Glue	$67		
6	Screw	$8		
7	**Total**	$204,777	Return to Summary	

FIGURE 1: EXCEL 97'S HYPERLINKS make it easier to navigate a complex worksheet.

Here's how to set it up: On the sheet where you listed the Project X data, calculate the total with a regular =sum() formula. Then select *Insert•Name•Define* and name the Total cell **ProjectXDetail**. In cell B3 of the summary sheet, enter the following formula: **=hyperlink("[projectlink.xls]ProjectXDetail",ProjectXDetail)**.

When the user clicks B3, Excel jumps to the cell named ProjectXDetail. To let the user return easily to the summary sheet, enter **=hyperlink("[projectlink.xls]Summary!A1","Return to Summary")** in a nearby cell, as in the bottom screen in Figure 1.

The formulas assume that you're moving to another range in the same worksheet, but they work just as easily across separate worksheets. Simply substitute another file name (and path, if necessary) for ***projectlink.xls*** in the formulas.

Finally, there's a trick to editing a hyperlink formula. You can't click it without being launched to another cell. So, to select and edit a hyperlink cell, you need to right-click it, then press **<Esc>** to cancel the pop-up menu.

```
Sub FillDays()
  Dim PeopleDates, CalendarDays As Range
  'Identify the calendar cells to fill, and the database
  Set CalendarDays = Worksheets("Calendar").Range("CalendarDays")
  Set PeopleData = Worksheets("ListLookup").Range("A2:b25")

  'Do the following for each cell in the calendar
  For Each c1 In CalendarDays.Cells
    'Do the following for each date in the list
    For Each c2 In PeopleData.Resize(PeopleData.Rows.Count, 1)
     'If the current date in the list matches the current calendar day
     If c1.Offset(-1, 0).Value = c2.Value Then
       '...enter the corresponding list item into the calendar
       c1.Formula = c1.Formula & c2.Offset(0, 1).Formula & Chr(10)
     End If
    Next c2
  Next c1
End Sub
```

FIGURE 2: TRANSFER DATA from an Excel database to a calendar with this macro.

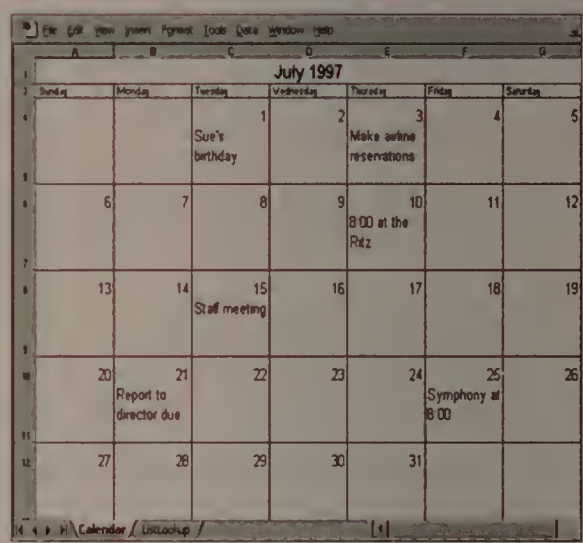
DISPLAYING EXCEL LIST DATA IN A CALENDAR

IN THE JUNE column, I showed how to set up a blank calendar in Excel. This month we'll transfer dated items from an Excel database into that calendar.

Begin by creating the calendar as described in "Put Your Calendar in an Excel Spreadsheet" (*Spreadsheets*, June). After you've named the calendar sheet, select *A5:G5*, then press and hold the **<Ctrl>** key as you select *A7:G7*, *A9:G9*, *A11:G11*, *A13:G13*, and *A15:G15*. Choose *Insert•Name•Define*, enter **CalendarDays** in the Name box, and click *OK*. Next, on a separate sheet, create a database like the one shown below. Name that sheet **ListLookup**.

	A	B
1	**Date**	**Note**
2	7/1/97	Sue's birthday
3	7/3/97	Make airline reservations
4	7/10/97	8:00 at the Ritz
5	7/15/97	Staff meeting
6	7/21/97	Report to director due
7	7/25/97	Symphony at 8:00

Now, create the macro that will fill in the calendar with the database entries. In Excel 97, select *Tools•Macro•Visual Basic Editor*, select *Insert Module*, and enter the FillDays macro shown in **FIGURE 2**.



Return to the calendar sheet and run the FillDays macro. It stops in each calendar cell, scans the dates in the database for a match, and if it finds one, writes the corresponding notation into the calendar, as in the figure above.

Spreadsheets welcomes your tips and questions and pays $50 for published items. Contributing Editor Richard Scoville is a software training consultant in Chapel Hill, North Carolina. See page 14 for contact information. ■

So why is this OK when it's e-mail?

If the Post Office treated your mail like garbage, you'd be outraged. So why put up with it from your e-mail program? Now there's a way to make sure you're never ever left staring at garbage text instead of an e-mail attachment. It's a hot new clean up program called **e-ttachment Opener™**.

From DataViz, the file compatibility specialists

This nifty utility solves all your problems receiving and reading e-mail file attachments. **e-ttachment Opener** will find the file within the garbage text and turn it back into exactly what you were supposed to receive. Whether that file was sent to you in BinHex, uuEncode or MIME formats. **e-ttachment Opener** also lets you view and print virtually any graphics, word processing, spreadsheet or database file. Even without the application that created it. Or extract almost any compressed file created in Zip, Gzip, z or tar.

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Override weird Word styles ◆ Add WordPerfect text art ◆ Fix Word Pro bug

Setting Default Formats in Word 6.0 and Word 97

NEW WORD USERS, particularly those who are switching from other programs like WordPerfect, often find it difficult to change basic formatting defaults in the program, such as justification and default font and size. But it's quite easy to alter Word's formatting defaults to get exactly the results you want.

When you start Word, it automatically loads its default normal.dot template, the foundation for every new document. Within the normal.dot template is a set of formatting styles. Change those, and you've changed the defaults for all new documents. Here's how to handle the job (see also **STEP BY STEP**):

1. Launch Word, select *File•New*, and then double-click the *Blank Document* icon (in Word 6.0, *Normal*) in the New dialog box. This selection loads normal.dot.
2. To change page settings such as margins, select *File•Page Setup*. In the Page Setup dialog box, set your margins, then click the other tabs to specify the paper size, paper source, and layout. (Check the results of your changes in each tab's Preview window.) Leave the 'Apply to' field set at 'Whole document', then click the *Default* button. In the confirmation box that appears, click *Yes* to make your changes permanent.
3. Once the basic page settings are set, select *Format•Style* to display the Style dialog box. Click *Normal* in the Styles list, then click the *Modify* button.
4. In the Modify Style dialog box, check the *Add to template* box to make sure your changes become the new defaults. If you forget this step, any changes you make will apply only to the current document. Now click the *Format* button, and from the drop-down list pick the items you want to change, such as *Font*, *Paragraph*, and so forth, and make your changes in the resulting dialog boxes. (Check your results in the Preview windows.) When you're satisfied with your changes, click *OK*, then click *Close*. Word will automatically save your changes in the normal.dot file when you exit the program.

When you change the Normal style as described above, all documents that you create thereafter will take on the new style. Documents that you had already created will remain unchanged.

SELECT LARGE BLOCKS OF TEXT AT NORMAL SPEED

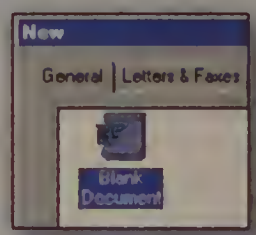
WHEN YOU'RE SELECTING a large block of text in Word, relying on the mouse for precision is nearly impossible: When the cursor reaches the bottom of the screen, the text scrolls by at turbo speed. Then when you backtrack to try to unselect some of the document, the text flies by in the opposite direction. ▶

STEP BY STEP

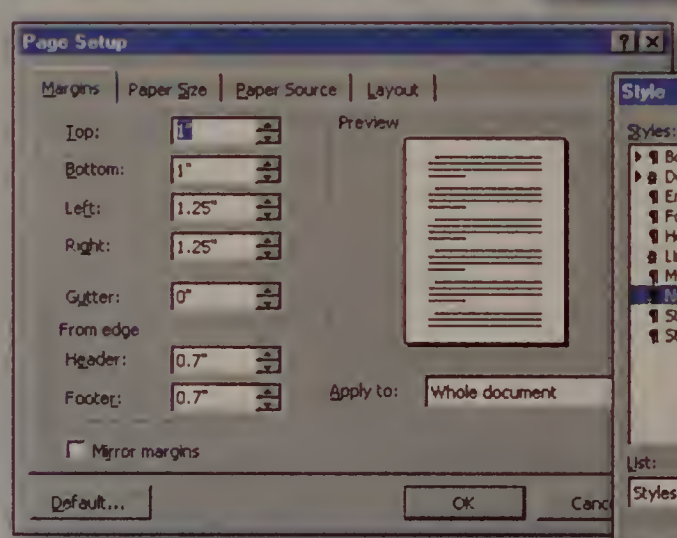
Modify Your Word Document Defaults by Editing the Styles in the Normal.dot Template

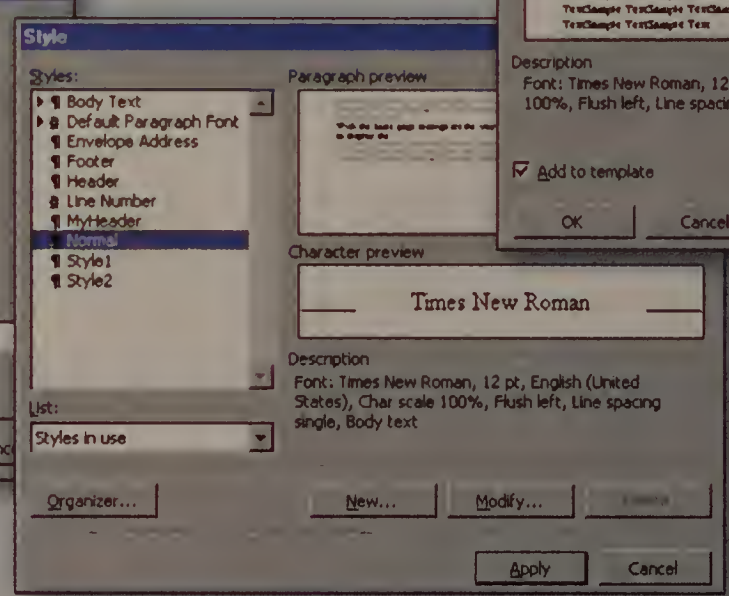
❶ Open a new blank document to load the normal.dot template. ▶

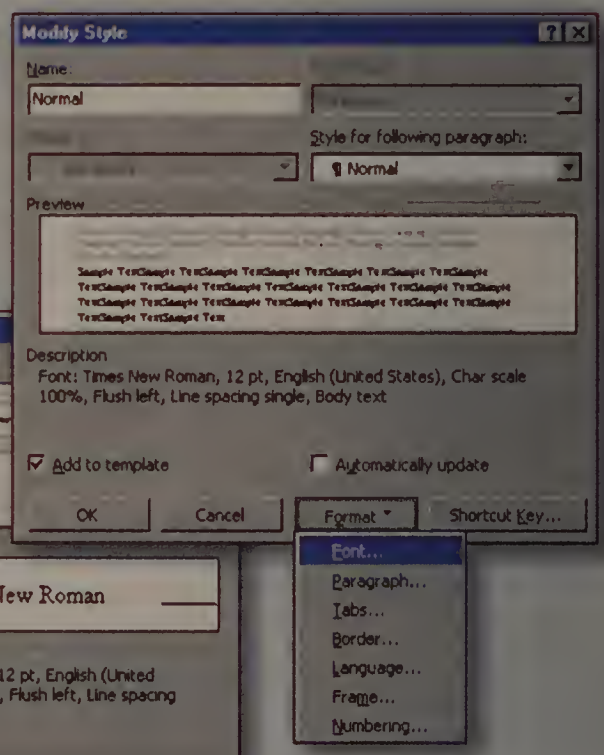
❷ Select *File•Page Setup* to change page settings, make sure the 'Apply to' box says 'Whole document', click the *Default* button, and then click *Yes* to confirm. ▼



❹ Check the *Add to template* box, and click the *Format* button to select each page element you want to change. Click *OK* when you're done, then click *Close*. ▶







❸ Select *Format•Style*, select the *Normal* style, then click *Modify*. ▶

what's your ANGLE?

No matter how you look at the new PanaFlat™ PF70 Monitor from Panasonic, it's perfectly flat. From the center to the very edges of the screen, in every corner, any angle... just plain flat. And that means you get exceptional clarity, near-zero reflectivity, and precision representation of every item on the screen.

Most CRTs are curved. This center "bulge" causes image distortion at the edges of the screen, and a light reflection across the entire screen.

The PanaFlat PF70 is uniquely designed to be flat both horizontally and vertically. Every item on the screen –at the edges and in the corners– is crystal clear. Its flat screen, 0.24 stripe pitch and 1600 x 1280 resolution make it truly a revolutionary monitor. Here's how we compare to the competition:

Model	Dot Pitch (mm)	Max. Res. (H x V)	Max. H. Freq.	ARP*
PF70	0.24	1600x1280	86 kHz	$849
NEC P750	0.25	1600x1200	94 kHz	$904
Nokia 447XAV	0.25	1600x1200	92 kHz	$968
EIZO FXC6	0.26	1600x1200	86 kHz	$960
SONY 17seII	0.25	1600x1200	85 kHz	$872

The PanaFlat PF70 is covered by the most extensive warranty and customer support program in the industry– a 3-Year Limited Warranty on parts, labor and the CRT, 1-Year 48-Hour On-Site Exchange Program, and 24-Hour, 7-Day Customer Support Hotline.

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To select text at a more reasonable scrolling rate, you can use the little-known Extend Selection mode. Click at the beginning of the text you want to select, then press **<F8>**. (On the status line, you'll see that the EXT box is turned on.) Now scroll through your document by pressing **<Right>** to select one character at a time, **<Space>** to select one word at a time, or **<Down>** to select one line at a time. Click again at the end of the highlighted text to select it. If you need to, you can continue to click through the text to extend your selection, or you can click at an earlier point to make the selection smaller. When you're finished, press **<Esc>** to turn off Extend Selection mode. You can also turn this mode on and off by double-clicking *EXT* in the status bar.

Word Pro Keyboard Navigation Shortcuts

To do this	Press this
Display the Formatting Info box and switch between it and the document.	<Alt>-<Enter>
Move the cursor to the beginning of the next sentence.	<Ctrl>-period key
Move the cursor to the beginning of the previous sentence.	<Ctrl>-comma key
Move the cursor to the beginning of a document with more than one division.	<Ctrl>-<Home>-<Home>
Move the cursor to the end of a document with more than one division.	<Ctrl>-<End>-<End>
Cycle through all open documents.	<Ctrl>-<Tab>

MOVING AROUND IN WORD PRO 96 OR 97 documents is a lot easier if you know a few keyboard shortcuts. While Word Pro uses all the normal Windows keyboard shortcuts, such as <Ctrl>-<Home> and <Ctrl>-<End>, it also has a few tricks of its own, and they're well worth memorizing.

KEEP WORD FILES YOUR STYLE

IT HAPPENS ALL THE TIME: You receive a Word file from someone and open it in your copy of Word, only to find that it's formatted in a weird-looking font called CartoonText, with strange indentations to boot. The creator of the document has modified the default settings in their normal.dot file, saving personal preferences with the document. When you open the file, Word selects formatting as close to the sender's intentions as possible.

To force Word to use your styles rather than the sender's, just select *File•Close* to get the strange-looking document off your screen. Select *File•New*, and double-click the *Blank Document* icon (in Word 6.0, *Normal*) to open a new, empty document. Then select *Insert•File* and select the document you want to view. Word will adapt the document to your normal.dot style settings. Select *File•Save As* and save the document with a new file name.

FIGURE 1: WORDPERFECT'S TEXTART FEATURE adds special effects to your documents.

ENHANCE DOCUMENTS WITH WORDPERFECT 7'S TEXTART

IF YOU'RE LOOKING for an easy way to punch up a humdrum document, don't forget about WordPerfect 7's TextArt feature. It can add impact to any document by turning text into a powerful graphical image. Here's how to use this tool:

1. Select some text, then select *Graphics•TextArt* from the menu.
2. In the TextArt 7 dialog box, click *More* and select a shape (see **FIGURE 1**). You'll see the result immediately in your document, so experiment until you get a shape you like. You can also select the font, style, color, and alignment from this dialog box. At any time, you can change the text itself by editing it in the 'Type here' box.
3. Once you've chosen your settings on the General page, click the *Options* tab to see more choices (see **FIGURE 2**). You can select fill patterns, shadows, and outlines for your text graphic and alter the amount of smoothing WordPerfect applies to the graphic. To change the orientation of the text, click the *Rotation* button and drag the handles that appear around the text box. When you're satisfied with your design, click *Close* to return to your document.
4. To change the dimensions of your text graphic, just drag its handles. To move the text graphic, click inside the box and drag it to a new position on the page. To change its appearance, double-click it to display the TextArt 7 dialog box.

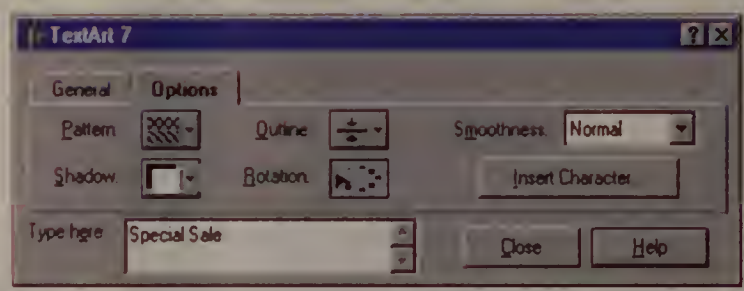

FIGURE 2: TEXTART'S OPTIONS TAB lets you add still more special effects to WordPerfect text.

TextArt is available in WordPerfect 6.1 as well. It works almost the same way, except that in version 6.1 you have to format the text graphic from a toolbar rather than a dialog box. In addition, you can't add TextArt effects to existing text. Instead, you select *Graphics•TextArt* and then type the text you want to enhance in the toolbar.

WORD PRO 96 GLOSSARY BUG

THERE'S A BUG in Word Pro 96's glossary feature that won't let you insert a glossary entry at the beginning of a blank line. When you type the entry's shortcut, then press <Ctrl>-K, Word Pro displays the Glossary dialog box instead of the text. Fortunately, there's an easy work-around.

Type the shortcut, then type a space, and Word Pro will insert the expanded text. Lotus has fixed this bug in Word Pro 97.

Word Processing welcomes your questions and tips and pays $50 for published items. Contributing Editor George Campbell is a contributor to The PC Bible *(Peachpit Press, 1995, 800/283-9444). See page 14 for contact information.* ■

This Little Baby Goes Into The GUTS Of This Bad Boy

Brace Yourself For This Stuff

The Intel Pentium® II processor gets airborne thanks to a combination of the brute power of Intel's Pentium® Pro processor and the multimedia wonders of MMX™ technology.

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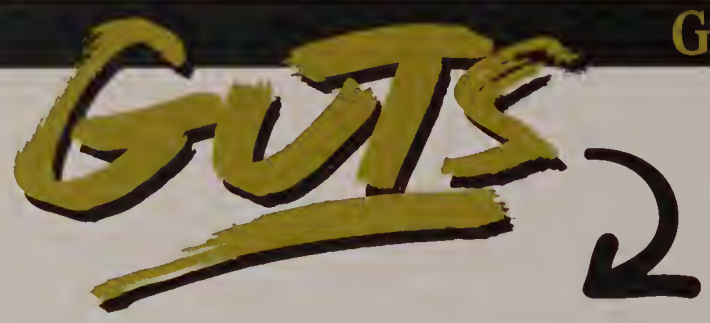
And You Get It From These Guys

MMX™ intel inside pentium® II PROCESSOR

G6-266XL



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  Two 32MB modules, two open sockets, expandable to 256MB
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  10 platters, 20 heads, 7200 rpm, programmable multi-segmentable cache buffer, 8.2ms access time
- **STB® ViRGE™ GX 4MB, 3-D 64-Bit PCI Graphics**
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  Minimum of 1800KB/second transfer on inner diameter, Maximum of 3600KB/second transfer on outer diameter
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- **Boston Acoustics® High-Fidelity 3-Piece Speaker System**
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- **TelePath® Modem** *for Windows* **with x2™ Technology***
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  Up to 8GB compressed, maximum data transfer rate of 30MB per minute, 5MB per second burst with 512K on-drive data buffer, one tape included
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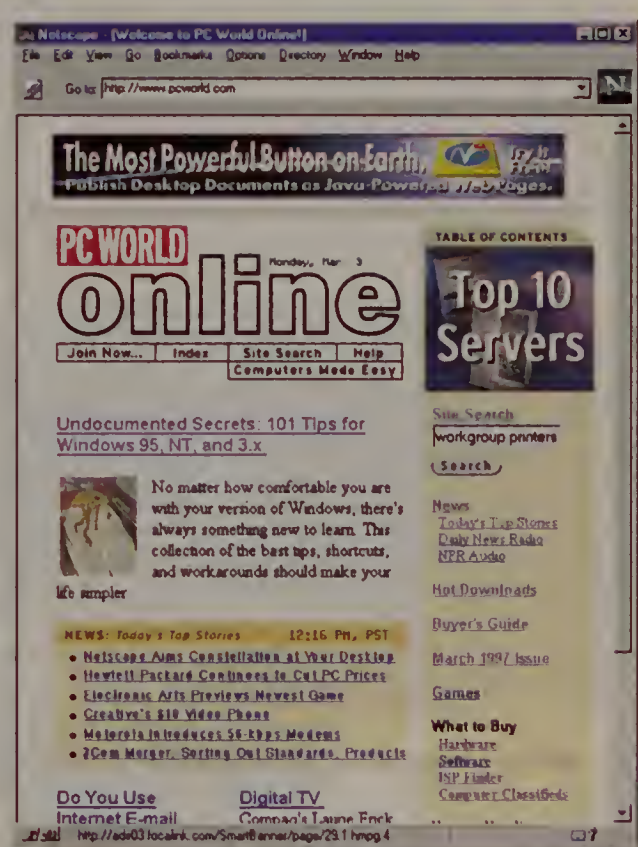

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Access 97 Hyperlinks Make Quick Connections

ACCESS 97 OFFERS many new features, but the ones with the most sparkle are all Internet related: the Web toolbar, the Publish to the Web Wizard, a Hyperlink tool for the form and report designers, and the new Hyperlink field type for tables. If you don't go on the Web, you may think you have no use for them.

Not so!

You can add hyperlinks to Access 97 forms, reports, and tables to create your own information highway. Hyperlinks are easier to create than macros and provide faster connections.

As you may know, a *hyperlink* is a piece of text on a Web page that you click to jump to another location on the Net. Behind the scenes, a hyperlink is associated with a URL (uniform resource locator) that points to another Web address.

In Access 97, you can create hyperlinks to navigate between tables, forms, and reports in a database or to jump to another Microsoft Office object. The form shown in **FIGURE 1** has two hyperlinks: one that opens another form in the open database (maybe one in which you specify more detail) and another that jumps to a Word document (perhaps a report to the boss adding narrative detail).

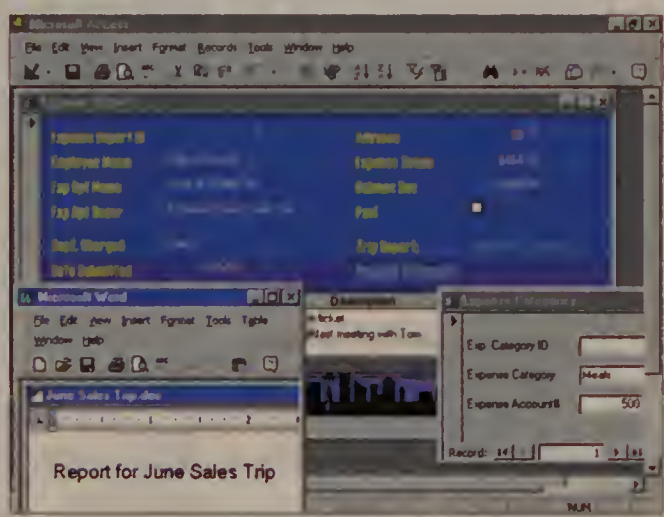

FIGURE 1: CLICKING ON THIS FORM'S HYPERLINKS opens another Access form or a Word document.

There are two ways to include hyperlinks in Access. One is to click the *Insert Hyperlink* tool on the Form Design toolbar (in forms only); the other is to add a hyperlink field to a table or a form. (You can also put a hyperlink on a report, but it will work only if you export the report to Word, Excel, or an HTML file.)

But which technique should you use? Simple: If you always want to jump to the same place, no matter what record you happen to be viewing, the Hyperlink tool is the way to go. If you need to store a different "jump" address in each record of a table, use a hyperlink field.

Figure 1 shows an example of each case: The hyperlink that opens the Expense Categories form was added to the design of the Expense Reports form with the Hyperlink tool. The address to the Word document June Sales Trip sits in a hyperlink field in the Expense Reports table. I'll show you how to create both types.

ADD A HYPERLINK TO A FORM

1. OPEN A FORM in design mode; click the *Insert Hyperlink* tool on the Form Design toolbar.
2. In the Insert Hyperlink dialog box, click the *Browse* button next to 'Named location in file (optional)', click the *Forms* tab in the Select Location dialog box, and double-click the name of the form you want to link to (see **FIGURE 2**). Click *OK* to close the Insert Hyperlink dialog box.
3. Select the hyperlink; drag it from the upper left corner of the design window to where you want it to appear.
4. Edit the label, if you like. I changed the default term *Form Expense Categories* to the shorter *Expense Categories*.
5. Right-click the label and select from the menu to change the font color or other properties, if need be.

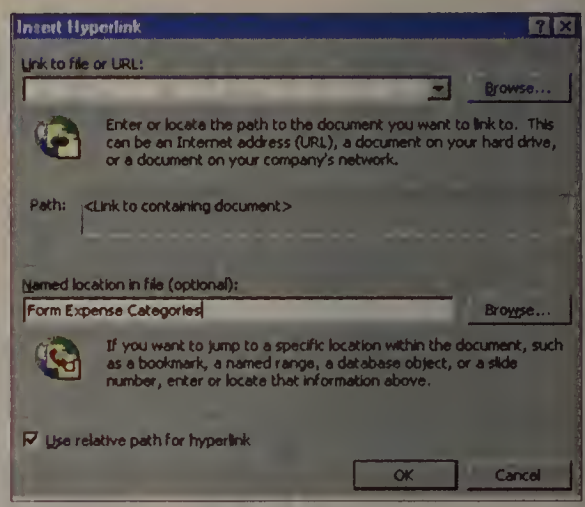

FIGURE 2: LINK OTHER DATABASE OBJECTS, Office documents, or Web sites to a form or table in the Insert Hyperlink dialog box.

ADD A HYPERLINK FIELD TO A TABLE

1. OPEN THE TABLE in design mode, then add a new field and assign this field the *Hyperlink* data type. For this example, I added the hyperlink field Trip Report to the Expense Reports table. Save your change to the table.
2. To enter a hyperlink address in the Datasheet view, first move the cursor over to the hyperlink field, and then click the *Insert Hyperlink* tool.
3. Click the *Browse* button next to 'Link to file or URL', and in the Link to File dialog box, find the file you want to jump to. (I chose \My Documents\June Sales Trip .doc.) Double-click the file name, then click *OK* in the Insert Hyperlink dialog box to insert the address in the field.

ADD A HYPERLINK FIELD TO A FORM

1. OPEN THE FORM in design view, highlight a text object for another field, and select *Edit•Duplicate* from the main menu.
2. Drag the copied text object to its new location on the form, right-click it, and choose *Properties*.
3. Set the *Control Source* setting to the name of the hyperlink field, and change the label to match.

Database Tips *welcomes your questions and pays $50 for published items. Contributing Editor Celeste Robinson is the coauthor of* Mastering Paradox 7 for Windows 95 *(Sybex, 1996, 800/227-2346).* *See page 14 for contact information.* ■

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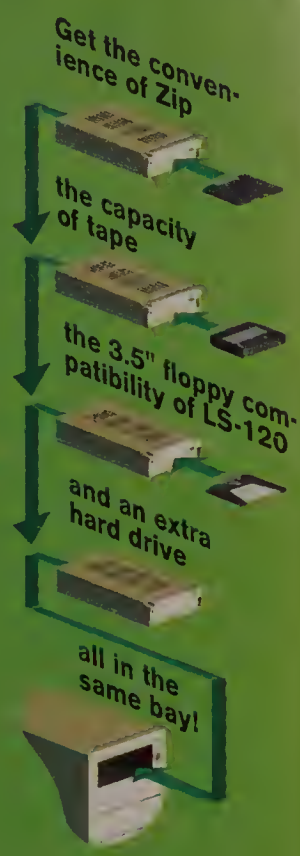

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Should You Upgrade Your Modem to 56 kbps?

DON'T YOU WISH that whenever Detroit came out with a new car you could trade in your old clunker for a faster model? That's the offer several modem manufacturers are making as cyberspace speeds up to 56 kbps.

Right now, the new modems support one of two competing (and incompatible) technologies. U.S. Robotics is pushing its x2 standard, while Rockwell Semiconductor Systems and Lucent Technologies tout their own K56flex. Both technologies employ an asymmetric transmission scheme by which a modem receives data at up to 56 kbps but can send it at only 33.6 kbps. Agreement over an international standard could be months away. (See "33.6 and Getting Faster.")

If you're eager to take advantage of the new speeds, which technology is best for you? It depends on which one your ISP or online service is using. Keep in mind that whether you choose an x2 or a K56flex modem, you'll probably have to upgrade again later to get the international standard. And keep in mind too that upgrading to 56 kbps from 28.8 kbps won't double your speed. In fact, a 43 percent boost is the most you may get, since 56 kbps is a maximum rather than average speed, and it can be achieved only on part of the route that connects you with your ISP.

U.S. Robotics offers several ways to upgrade to x2. All Courier V.34 modems can be upgraded for $60. You fill out a form and download the firmware update from the USR Web site (www.usr.com/x2) or BBS (847/982-5092), then call USR at 888/877-9249 for a code to activate the upgrade. You then install the firmware and turn the modem off and back on.

Non-x2 Sportster modems purchased since August 15, 1996, are also upgradable for $60, but most need a new ROM chip and must be shipped back to USR or taken to a participating retailer. The Sportster Winmodem is the only one that can be upgraded with software like the Courier models.

As we went to press, USR had not determined how its modems would be upgradable to the still-emerging international high-speed standard. But company spokesperson Philip Anast says that it will probably be a matter of downloading code, adding, "We're going to take people to the standard, whatever it is." To get more information on USR upgrades, call 888/877-9896.

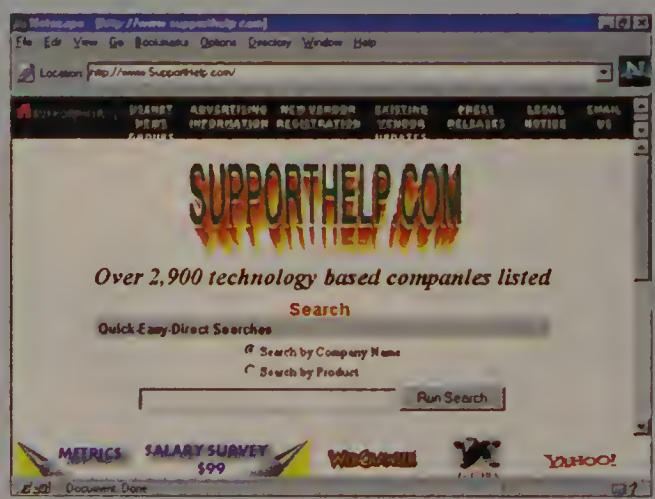
Meanwhile, Hayes Microcomputer is offering low-cost modem trade-ins. Mail in any modem, no matter the brand, and for $89 to $99 plus $15 for shipping, Hayes will send you a K56flex modem. You can get more details about the trade-in plan at Hayes's Web site (www.hayes.com) or by calling 770/441-1617. Hayes claims that one third of the modems traded in so far have been USR models.

Hayes is also selling x2 modems under its Practical Peripherals brand. Hayes spokesperson Kerri Dimke says all 56-kbps modems obtained through Hayes will be upgradable for free to the international standard, probably through software.

Other vendors are taking Hayes's lead. Boca Research is letting its customers upgrade their 33.6-kbps Boca modems for $99 plus $14.95 shipping. Multi-Tech's V.34 modems can be upgraded for $99 plus $15 shipping if they were bought before February 1, 1997, and for $69 plus shipping if purchased after that date. Multi-Tech's 56-kbps modems aren't yet available, however.

One-Stop Tech Support on the Web

TIRED OF WAITING on hold for tech support while stuck with a dysfunctional tape backup or an inscrutable application? Tap into the SupportHelp.com site (www.SupportHelp.com). Search for a company by name, and SupportHelp.com directs you to any technical resources available for that company's products, including mailing lists, newsgroups, and other related sites (both official and unofficial). SupportHelp.com includes a database of toll-free numbers and main telephone contacts for almost 3000 PC companies.



GET OFF THE PHONE and onto the Web for technical help from thousands of computer companies.

SUN, SURF, AND A GOOD READ

WHAT WOULD SUMMER be without lazy afternoons spent curled in a hammock reading a book that lacks any redeeming social value? Tap into one of the book sites listed in "Browse the Web's Bookshelves" to find the latest about your favorite genre or author. Some of the sites even offer databases of all the books written by every author in a certain genre (see **FIGURE 1**).

You can also try typing the name of a publisher into your browser as a URL—for example, www.randomhouse.com. ▶

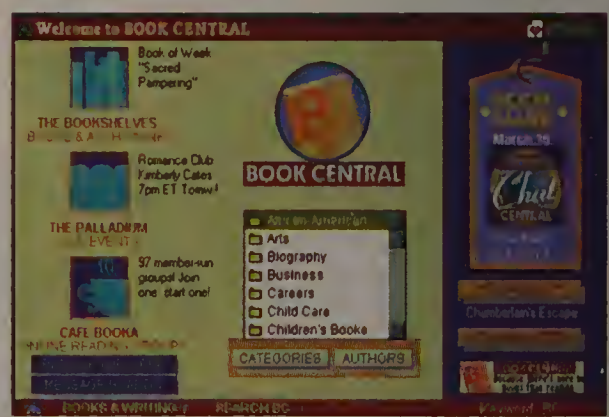


FIGURE 1: AOL'S BOOK CENTRAL (keyword books) offers the latest about your favorite authors.

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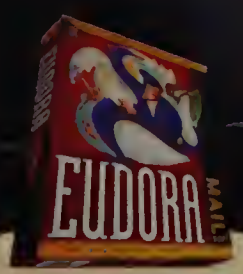

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Spiff on Science Fiction & Fantasy http.tamu.edu/~sdd2252/Docs/SciFi	Links to author and publisher pages, Internet discussions, and reviews
The Literary Times www.tlt.com:80	News and chat about romance novels

Or enter the names of your favorite authors into a search engine to see if they have their own Web sites.

If you still can't find what you're looking for, try *The Book Lover's Guide to the Internet* by syndicated book reviewer Evan Morris (Ballantine, 1996, 800/793-2665).

CREATE A SHORTCUT TO DIAL ANOTHER COMPUTER

PERHAPS YOU'RE TOO young to remember when people dialed in to other computers using nothing but a modem and a general communications program. Sometimes they still do, to log on to a BBS or a computer that's not on the Internet. For example, I regularly dial in to my local public library's card catalog.

In Windows 95, you can create a Shortcut that dials for you. Here's how.

1. Select *Start•Programs•Accessories•HyperTerminal*. (HyperTerminal is Windows 95's dialing program, and not a bad one.)
2. Double-click the *Hypertrm* icon in the resulting window.

3. In the Connection Description dialog box, type the name of the computer you want to dial in to and select an icon to represent it (see **FIGURE 2**). Click *OK*.
4. In the Phone Number dialog box, type in the phone number you want the program to dial, and click *OK*. In the Connect dialog box, click the *Dial* button to dial it now; otherwise, click *Cancel*.
5. Back in the HyperTerminal window, select *File•Save*. An icon for your settings will appear in the HyperTerminal window.
6. Drag this icon to your desktop to create the Shortcut.

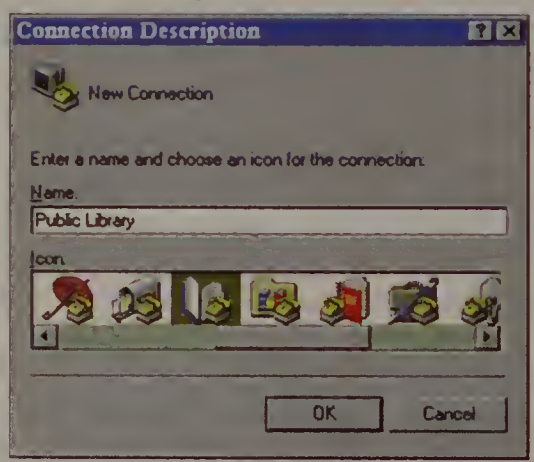


FIGURE 2: ACCESS ANOTHER COMPUTER by creating a Shortcut on your desktop.

BROWSE FTP SITES FOR DOWNLOADS

MICHAEL LAMB of San Ramon, California, uses his Web browser to tap into FTP sites where he can download (or upload) software. To automate log-on, he added his user name and password to the URLs he accesses frequently.

The syntax for the URL you'd type into your browser would look like **ftp://username:password@ftp.hostname/directory/**. So to log on as an anonymous user to *PC World's* FTP site and tap directly into the public directory (where all the downloadable goodies are stored), you'd type **ftp://anonymous:anonymous@ftp.pcworld.com/pub**.

PRINTING SELECTIONS FROM WEB PAGES

IS THERE A WAY to print only a selection of text from a Web page? Often I'd like to forward a snippet of text in an e-mail message or send it to a printer or fax machine. But I always end up sending the entire page.

Nick Blaha, Overland Park, Kansas

YOU CAN TREAT TEXT on a Web page just as you would text in a word processing document. Highlight the text you want to print, e-mail, or fax. Copy it into the Clipboard (press **<Ctrl>-C** or select *Edit•Copy*). Then paste it into an e-mail message or word processing document (press **<Ctrl>-V** or select *Edit•Paste*) and print it.

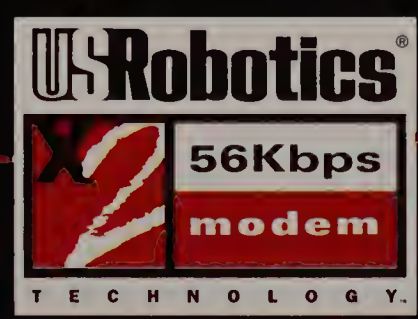
If you want to save the text of the page to print later, select *File•Save As* and save it as an HTML file (with formatting but no graphics) or as a text file (unadorned text). Then simply print it as you would any file.

VISIT THE HACKER'S DICTIONARY ON THE WEB

ALEXANDER WEIS of Ein-Harod Ihud, Israel, found a version of the seminal Hacker's Dictionary that's better than the one printed in February's column (see "Web-Webster's Dictionaries"). The New Hacker's Dictionary (locke.ccil.org/jargon) is a compilation of computer-room slang from MIT, Stanford, and other computer science meccas. It has been in circulation since the genesis of the Net in the 1970s and offers glimpses into computer culture. (Did you know that hackers are more likely to own cats than dogs?)

Hackerspeak is rife with euphemisms for equipment failures (like *lossage*) and for hapless victims of computer caprice. For instance, a *headseeker* is one who buys the newest version of any product, regardless of its usefulness. The *lunatic fringe* are those who blithely run version 1 of a program without questioning if it works.

Internet Tips *welcomes your questions and tips and pays $50 for published items. Contributing Editor Judy Heim is the author of* The Needlecrafter's Computer Companion *(No Starch Press, 1995, 800/420-7240). See page 14 for contact information.* ■



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** An x2-capable modem, an x2-compatible local analog phone line and an x2-capable service provider are required for these high speed downloads. See www.usr.com/x2 for details.

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To get your free month of Internet service with an x2-capable Internet service provider, just complete and return the card below.

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3. Fill in all requested information on this card.
4. Enclose this completed form with a copy of your dated modem receipt, original UPC bar code symbol and serial number from the modem package (see samples below) and proof of your x2 ISP monthly fee (credit card bill or monthly statement) and mail to:
   U.S. Robotics, x2 Delivers, PO Box 8061, Young America, MN 55551-8061
   (Any questions regarding this program, please call 1-800-727-2107.)

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UPC SAMPLE

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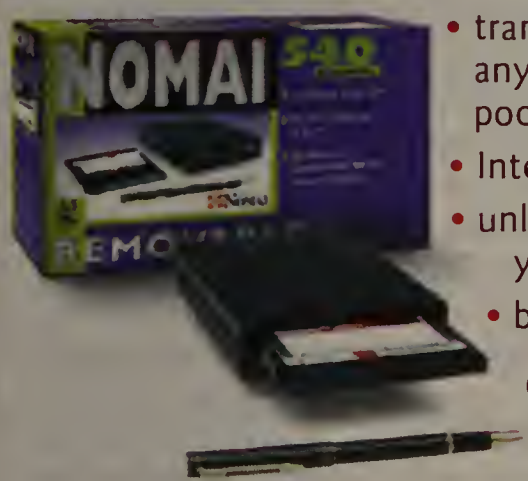

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Circle 161 on reader service card

Add the Right Memory

HERE ARE THE TWO great myths from the Pacific Northwest: the legend of Bigfoot, and the claim that Windows 95 can run well with 8MB of memory. If you've got anything less than 16MB, it's time to think about a memory upgrade, and you may want to move all the way up to 32MB. Here's how to pick what you need.

BANG FOR THE BUCK

UPGRADING MEMORY from 8MB to 16MB is easily the best value for your money. *PC World* tests show it boosts Windows 95 performance on Pentiums by up to 29 percent (see "Upgrades: The Best for the Buck," November 1996). And if you really *use* your computer—say you commonly have a word processor, spreadsheet, e-mail program, and Web browser open at the same time—you should move on up to 32MB. Switching between programs will be much faster and quieter.

DO YOUR HOMEWORK

THE HARDEST PART of installing more memory is making sure you buy modules of the right type, speed, and size. The wrong memory just won't work. But ads for memory can be rather cryptic (see **FIGURE 1**). And opening up your computer and looking at the modules doesn't really tell you much, either. Your best bet is to check your system manual or call the manufacturer and confirm the following points about your system's memory:

Type. RAM comes in several different types. If you've got a 486 or an older Pentium, you're probably using Fast Page Mode RAM. The successor to FPM RAM is called Extended Data Out RAM and runs 10 to 15 percent faster. Positioned to replace EDO RAM is Synchronous Dynamic RAM, which further boosts performance through superior synchronization with the CPU and other components. Generally, you can't mix memory types.

Socket. Memory chips come mounted on a small card known as a SIMM (single in-line memory module) or, on newer systems, a DIMM (dual in-line memory module). Each has a row of pins on an edge connector at the bottom of the card that fits in a socket on the motherboard. SIMMs come with either 30 or 72 pins, while DIMMs have 168 pins (see **FIGURE 2**).

Speed. Memory chips are designed to operate at certain maximum speeds, typically 60, 70, or 80 nanoseconds (billionths of a second). Placing fast RAM on a motherboard designed for a slower memory speed is okay, but it won't buy you any quicker performance. Never put slower memory on a faster motherboard.

Parity. Memory modules are either parity or nonparity. A parity module has an extra chip, usually a ninth, added for error checking. Some motherboards work with either parity or nonparity modules, but not with both types in combination.

Size. When adding memory, size and symmetry matter. SIMM sockets are usually arranged in banks, or groups, of two sockets each. Both sockets in a single bank *must* be filled with SIMMs of identical memory size. For example, if your computer currently has 8MB of RAM and two SIMMs in the first bank (Bank 0), then each of the SIMMs is 4MB in size.

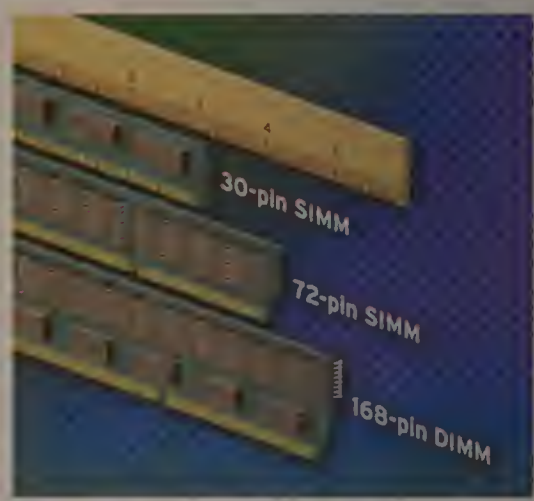

FIGURE 2: MEMORY MODULES come in the three basic sizes shown here.

It's important to check your motherboard and see how many free sockets you have before you buy. Let's say in the above example you had two free SIMM sockets in the second bank (Bank 1). To upgrade your system from 8MB to 16MB, you would need two more 4MB SIMMs; one 8MB SIMM won't work. To upgrade to 24MB, you might be able to put two 8MB SIMMs in Bank 1; many motherboards will let you use different-size SIMMs in different banks. But some require all SIMMs in all banks to be identical; check your documentation.

online *Find more tips at www.pcworld .com/hereshow.* Hardware Tips *welcomes your questions and tips and pays $50 for published items. Kirk Steers is a* PC World *contributing editor. See page 14 for contact information.* ■

How to Read a Memory Ad

FIGURE 1: Advertisements for memory modules can be downright cryptic. Here's how to interpret them correctly.

TYPICAL 30-PIN SIMM AD

What it says	What it means
1 x 9-60	1MB, 60ns parity SIMM
4 x 9-70	4MB, 70ns parity SIMM

- First number is size in MB.
- Second number is number of chips on the SIMM; 9 denotes a parity SIMM.
- Third number is speed in nanoseconds.

TYPICAL 72-PIN SIMM AD

What it says	What it means
1 x 32-60	4MB, 60ns nonparity SIMM
2 x 32-70	8MB, 70ns nonparity SIMM
4 x 36-60	16MB, 60ns parity SIMM
8 x 36-70	32MB, 70ns parity SIMM

- First number is one-quarter the size in MB.
- Second number is number of chips on the SIMM times 4. 32 denotes nonparity; 36, parity.
- Third number is speed in nanoseconds.

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Circle 240 on reader service card

Getting Started With Digital Video Editing

GOT ANY ADVICE on buying and using a cheap video capture board to edit camcorder movies?

John Clifford, Chevy Chase, Maryland

YOUR TIMING IS GREAT. With high-speed Pentiums, gigabyte-size hard drives, and fast graphics and video accelerators becoming common and digital video hardware and software prices dropping, more and more of us are transferring our videotapes to PCs for editing.

Whether you want to produce lively videos for business presentations or Web pages, add flashy transitions and special effects, or just get your favorite home video clips into PC form, a host of affordable video capture boards is available.

Here are some pointers to help you select the system that's best for you.

One-way versus two-way boards. In general, there are two types of video capture boards: A "one-way" board provides video input connectors only; a "two-way" board also has video output connectors.

An input-only board is fine if you just want to create video for playback on a PC—a multimedia presentation, for example, or a Web page. But if you also want to copy your digitally edited video back to videotape, you'll need a combination input/output board.

You'll find a range of input-only capture boards, costing as little as $199 on the street, from companies such as Creative Labs (www.creativelabs.com), Intel (www.intel.com), and Winnov (www.winnov.com). Combination boards from companies such as Alaris (www.alaris.com), Data Translation (www.b-way.com), and Truevision (www.truevision.com) typically cost at least $400. Most capture boards now provide both composite (RCA-type) and higher-quality S-Video connectors.

Sound considerations. Most video capture boards provide video connectors only, so you'll need a separate sound card (or sound-enabled motherboard) to record sound as well as video during capture. Some video capture boards provide their own audio input connectors—a nice convenience if your PC lacks a sound board.

Although most video capture software gives you an option to synchronize audio during capture, some people prefer to record video and sound separately, and sync them together later.

PCI versus ISA boards. For best results, choose a PCI-based video capture board over an ISA-based board. You'll pay more, but get better video quality.

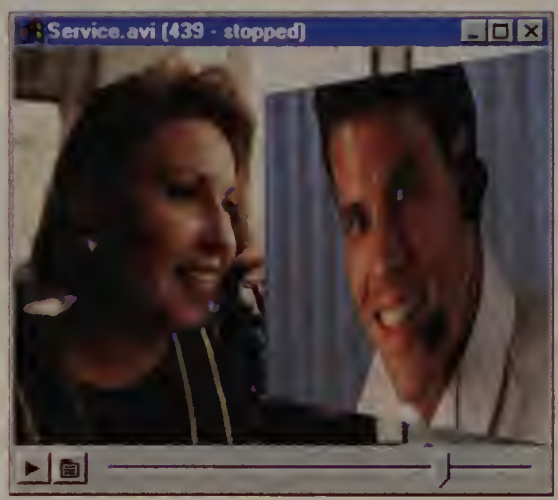
Capture size. Most low-end boards let you capture video at a maximum size of 320 by 240 pixels, commonly referred to as quarter-screen size. You may be satisfied with viewing quarter-screen videos on a PC screen, and even smaller videos on the Internet. But if you transfer your edited video back to videotape and view it on a TV set, you may be disappointed, since the video will retain its quarter-screen size. For instance, a 320-by-240-pixel image translates roughly to a 7.5-by-5.5-inch image on a standard 19-inch TV.

For best results in transferring your work back to videotape for TV viewing, get a board that lets you capture video at 640 by 480 pixels, or at least 320 by 480 pixels. Both sizes provide a larger screen image on a standard TV set. Bear in mind, however, that these higher resolution videos make much larger files than 320-by-240 videos, so you'll probably need gigabytes of storage space, too.

Frames per second. Most of the current crop of low-end video capture cards let you capture various resolutions at up to 30 frames per second, which is an ideal speed for smooth-looking playback on a TV set. If you capture at a slower speed, the file size will be smaller but the video may look jerky. Don't settle for a board that captures less than 30 fps.

TV tuners. Some video capture boards come with a built-in TV tuner that brings television to your PC. To use this option, you simply attach a coaxial video cable from the TV to the input on the board.

Your PC's capabilities. The system you'll need depends on how you'll use your videos. If you want to capture short clips and play them in informal situations, you may like the Alaris QuickVideo ISA board, which requires only a 486DX2/66 with 8MB of memory and 20MB of free hard disk space. But performance and quality will improve with a higher end PC. If you want to capture and edit longer clips and copy them to videotape, get a Pentium-class PC with at least 16MB of memory and 500MB of free hard disk space.



ADD JAZZY EFFECTS, like the peeling page and opening door here, with video editing. These were created with a MiroVideo DC10 video capture board and Ulead MediaStudio video editor.

Find more tips at www.pcworld.com/hereshow. Multimedia Tips *welcomes your questions and tips and pays $50 for published items. Richard Jantz is a computer consultant and freelance writer in Kensington, California. See page 14 for contact information.* ■

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Circle 128 on reader service card

Swap In a New Motherboard

YOU CAN PLAY with processor upgrades, add memory, or plug new cards and peripherals into your computer. But nothing turbocharges an aging PC like a motherboard transplant.

Changing a motherboard requires many careful steps, but you can handle the job if you're comfortable with PC upgrades in general.

Before you begin, make sure your PC has a standard motherboard. Some name-brand systems don't. Compare your present motherboard to a standard one if you can. Otherwise, check whether the serial and parallel ports are soldered to the motherboard and stick out the back of the case; if so, you're in trouble.

Look for a "Baby AT" motherboard. Don't buy an ATX motherboard, which requires a special case and power supply.

Here's a quick rundown on how to make the swap. For a more detailed version, check out www.pcworld.com/hereshow.

Stan Miastkowski is a PC World *contributing editor.*

Check your motherboard. Make sure your new motherboard's screw holes and card slots fit your system case, and that you can use your existing add-in cards if needed. Access your PC's system start-up program and note your hard disk's parameters. Turn off your computer and open the case.

Disconnect wires and cables. Use masking tape to label wires and cables. Unplug all external peripherals. Disconnect the cables from add-in cards and take out the cards. Remove the main motherboard power connectors. Remove the small wires at the front of the motherboard.

Out with the old. Touch your hand to a grounded object, and remove the screws holding the motherboard. (If it also is held by white plastic posts, grab the motherboard and slide it slightly to the left, which should release the posts from their slots.) Lift the motherboard carefully from the case.

In with the new. Add the CPU and memory to the new motherboard if necessary. Check all jumpers and use needle-nose pliers if you need to reset any. If the old motherboard has plastic posts, remove them with the pliers and add them to the new motherboard. Insert the new motherboard and replace the screws.

Replace cards and cables. Connect all the cables and connectors (usually for the floppy drive, hard disk, CD-ROM drive, and serial and parallel ports) and the small wires for the CPU fan, speaker, reset button, turbo light, and any other integral components. Replace all other required cables.

Start it up. Turn on your PC and monitor. You should see a new BIOS message. If you get an error message, enter the system start-up utility and fill in information as needed. Then restart, click your way through Windows 95's messages if that's what you're running, and enjoy the new speed! ■

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Source *PC Magazine*, December 3, 1996

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Dell XPS Pro200n	18
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Winstone 97 Business	
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- Microsoft serial mouse
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- Sys 104 key Windows 95 Keyboard
- Microsoft serial mouse
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- 32MB 60ns, 32-bit EDO RAM
- Hard Drive - 2.1GB 5400rpm, fast ATA-2
- Teac 1.44MB Floppy
- Matrox Millennium 2MB WRAM 64-bit accelerator
- Monitor - 17" Sys, high res .26 dot pitch, 95KHz refresh
- Sys 104 key Windows 95 Keyboard
- Microsoft serial mouse
- Case - Tower, 8 drive bays, ATX form factor, 235W power supply
- 12X CD-ROM Drive
- Sound Blaster 32 PnP wavetable
- 80W powered speakers
- Cardinal int. 33.6K, V.34 Modem w/ 14.4 fax
- Operating System - Windows NT Workstation v.4.0 (preinstalled, with CD & docs) (Windows 95 optional)

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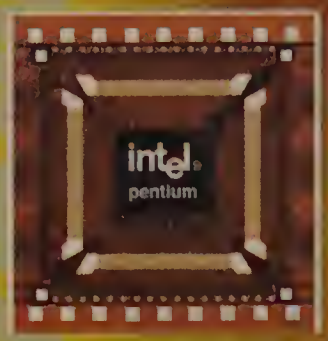

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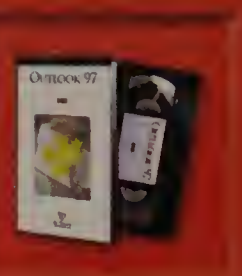

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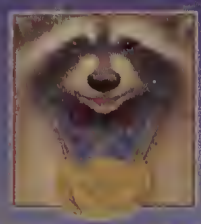

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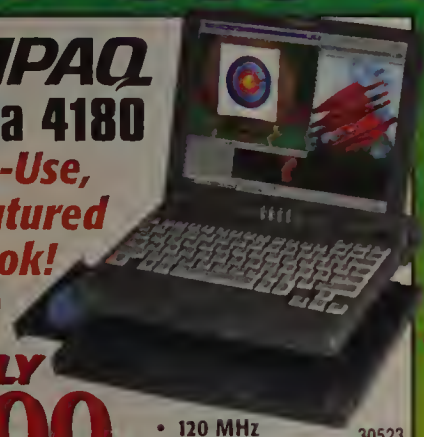

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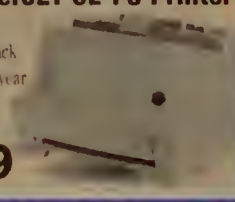

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M500 Multimedia (15"/13.7" VIS)	$379
M700 Multimedia (17"/15.7" VIS)	$749
MultiSync XV15+ (15"/13.7" VIS)	$379
MultiSync XV17+ (17"/15.7" VIS)	$699
MultiSync XE21 (21"/19.5" VIS)	$1674

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VS-15ES (15"/13.7" VIS)	$334
VS-15GA (15"/13.7" VIS)	$398
VS-17GS (17"/15.7" VIS)	$398
17GS (17"/15.7" VIS)	$649
Sonictron VS-PT770 (17"/15.7" VIS)	$713
VS-20G (20"/18.6" VIS)	$1114
20G (20"/18.6" VIS)	$1199
VS-G810 (21"/19.5" VIS)	$1511

MAG INNOVISION

DX1595 (15"/13.7" VIS)	$349
DX1795 (17"/15.7" VIS)	$619
DX700T (17"/15.7" VIS)	$689

*Monitor size refers to CRT viewable image size.

PRINCETON GRAPHICS

E040 (14"/13.4" VIS*) .28dp	$229
E050 (15"/13.8" VIS*) .28dp	$289
E070 (17"/15.8" VIS*) .28dp	$519
E075 (17"/15.8" VIS*) .26dp	$639

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100SX (15"/13.7" VIS)	$399
200SF (15"/13.7" VIS)	$799
Multiscan 17SEII (17"/15.7" VIS)	$976
Multiscan 20SX (20"/18.6" VIS)	$699
Multiscan 20SFII (20"/18.6" VIS)	$1635

PANASONIC

PanaSync E15 (15"/13.7" VIS)	$320
PanaSync/Pro P15 (15"/13.7" VIS)	$390
PanaSync S17 (17"/15.7" VIS)	$638
PanaSync P17 (17"/15.7" VIS)	$762
PanaSync E21 (21"/19.5" VIS)	$1405

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T2314EDO Terminator 3D PCI, 4MB	CALL
T2212EDO Terminator 64 PCI, 2MB	$81

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ATI-3DXPC12 3D Xpression PCI, 2MB	$145
GPROTURBOPCI2 Graphics Pro Turbo, 2MB	$219
GPROTURBOPCI4 Graphics Pro Turbo, 4MB	$312

CREATIVE LABS

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GBMA202 Graphics Blaster MA202	$86
GBMA302 Graphics Blaster MA302	$129

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MEGAHERTZ

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33.6 with XJack, Cellular capable	$229.95
33.6 Modem 10Base-T with XJack	$289.95
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10Base-T (cc 10 BT)	$109.95

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V56K PC-Card, K56Flex	$199.95
33.6 PC-Card EZ-Jack	$135.95

Practical 56K modems available in either x2 or K56Flex version. Must specify.

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Boca M56 (External) K56Flex	$165.95
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Accura 33.6 w/SmartCom Software HAY-02758	$105†
Hayes 56K K56Flex	$179.95
Hayes 56K K56Flex	$165.95†

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Sportster 33.6 Internal	$129
Sportster 33.6 Externet	$159
Sportster 56K Internal	$197.95
Sportster x2 56K External	$217.95
Courier V. Everything CR-001223	$210†
Courier V. Everything CR-001224	$240

*Price after manufacturers rebate † Internal Modem

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D1-ACS53 27W	$149
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DeskJet 820CXi/870 CXi	$379/$489
DeskJet 1600C /CM Printer	$1289/$1869
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LaserJet 6P/6MP	$719/$879
OfficeJet 330 (Printer/Fax/Copier/Scanner)	$499
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Stylus Color 600	$299
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HL-1060 (10ppm, 1200x600, dual bins)	$799
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MFC-1950+ (ribbon)	$499
MFC-4550 (laser)	$799
MFC-6550MC (laser)	$999
MFC-7550MC (laser)	$1199

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ML590/ML591	$449/$609

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BJC-620	$399
LBP-465 (Laser)	$359
C2500 (Fax, Scanner, Printer, Copier)	$599

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DeskPro 6000, P166, 32MB, 2.18GB	$2449
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Family Classic P166, 16MB, 2.5GB, MT, 12X, 15" ZIP Drive	$1999
Multimedia Tower P200w/MMX, 32MB, 6.0GB, 12X, 17", FC800	$3699
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515MCX, 5/133, P133, 16MB, 256K, 1.6GB, 8X, Sound, Telephony	$1599
515MCX, 5/166, P166, 16MB, 256K, 2.5GB, 8X, Sound, Telephony	$1999

Compaq & HP models do not include monitor unless otherwise stated

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ES1000C	$539
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Flatbed Scanner 636 (Artists)	$1275
Flatbed Scanner 636 (Exec)	$891

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Scanmaker E6	$459
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HP ScanJet 4S Scanner	$179
HP ScanJet 5P Scanner (color/grayscale)	$369
HP ScanJet 4C Scanner (color)	$789

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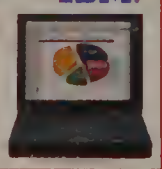

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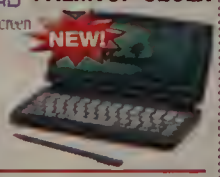

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Satellite Pro 430CDT P120, 11.3" TFT, 1.2GB	$2599
Tecra 500CS, P120, 12.1" Ds, 1.3GB	$1399
Tecra 500CDT P120, 12.1" Act., 1.3GB	$2899
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Tecra 730CDT P150, 12.1" Act., 2.0GB	$4999
Tecra 740CDT, P166 w/MMX, 13.3" Act., 2.0GB	$6199
Portege 650CT, P133, 1.3GB	$3599
Portege 660CDT 11.3 Act, P150, 1.35GB, 10X CD	$4599

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P120E, P120, 11.3" Act, 6X CD-ROM, 1.3GB	$1999
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5500CT, P120, 16MB, 1.35GB, 10.4" Act.,	$2639
5500CT, P133, 16MB, 2.0GB, 12.1" Act.	$3169
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IBM ThinkPad

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430CDS	120MHz	11.3" Dual Scan	16MB/1.2GB	10X	1969
420CDT	100MHz	11.3" Active	8MB/1.2GB	6X	2399
430CDT	120MHz	11.3" Active	16MB/1.2GB	10X	2619

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500CDT	120MHz	12.1" Active	16MB/1.3GB	10X	2749*

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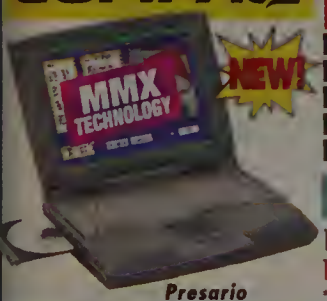

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1080	166MHz MMX	12.1" Active	16MB/1.44GB	10X	4249

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MX133T	133MHz	12.1" Active	16MB/1.35GB	8X	$4599*
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560	133MHz	11.3" Dual Scan	8MB/2.1GB	Opt.	2499
560	133MHz	12.1" Active	8MB/1.1GB	Opt.	4199
560	133MHz	12.1" Active	8MB/2.1GB	Opt.	4399

*Price after instant rebate and price break.

ThinkPad® 560
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C8E	166MHz MMX	32MB/3.2GB	16X	1999
C9E	200MHz MMX	32MB/3.2GB	16X	2099
S8C	166MHz MMX	32MB/3.2GB	16X	1999
S9C	200MHz MMX	32MB/4.2 GB	16X	2599

Aptiva S Series Monitors

Model	Size	View	Resolution	Price
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G70	17"	15.7"	1280 x 1024	739

Monitors priced separately

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Packard Bell D1000 Multimedia

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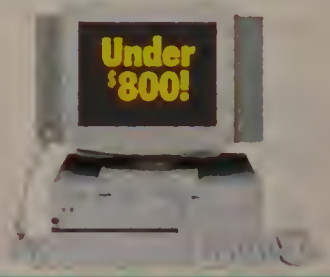
- 8X CD-ROM drives
- 33.6/14.4 data/fax modem
- 16MB EDO RAM memory
- 1.2GB Hard Drive



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$799.00
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Model	CPU	RAM/HD	CD	Price
D1000	133MHz	16MB/1.2GB	8X	$ 799.00*
D141	133MHz	16MB/1.7GB	16X	999.00
L190	200MHz	16MB/2.0GB	16X	1399.99
2240X	200MHz MMX	32MB/3.2GB	16X	1899.99

Packard Bell Monitor

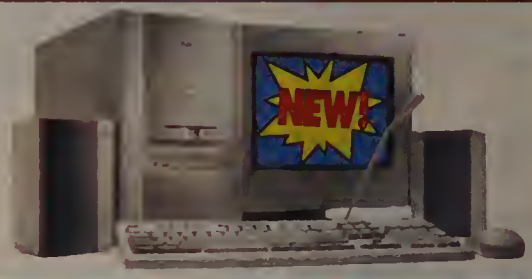
Model	Size	View	Resolution	Price
Monitor	14"	13.25"	1024x768	$ 299.00

Monitors priced separately

NEC

Ready 9704 Multimedia

- 200MHz Pentium processor
- 16X CD-ROM drives
- 56K data/fax modem with speaker phone
- 24MB EDO RAM memory
- 3.2GB Hard Drive



Ready 9704
$1599
3-Year TAP Warranty..... $99.97
5-Year TAP Warranty... $149.97

Model	CPU	RAM/HD	CD	Price
9704	200MHz	24MB/3.2GB	16X	$1599.00
9710	166MHz MMX	16MB/2.1GB	8X	1799.00
9712	166MHz MMX	32MB/3.2GB	16X	1999.00

NEC Monitors

Model	Size	View	Resolution	Price
XV15+	15"	13.8"	1280x1024	$380
XV17+	17"	15.6"	1280x1024	729

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HEWLETT PACKARD Pavilion

HP Pavilion Multimedia

Pavilion 7420
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Pavilion 7420 Multimedia

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- 16X CD-ROM drives
- 33.6/14.4 data/fax modem with speaker phone
- 32MB EDO RAM memory
- 3D stereo audio and graphics

Model	CPU	RAM/HD	CD	Price
7420	166MHz MMX	32MB/2.5GB	16X	$1699
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7360	200MHz MMX	32MB/3.8GB	16X	2299

* Factory Refurbished

Pavilion Monitors

Model	Size	View	Resolution	Price
Pavilion	15"	13.8"	1024 x 768	$449
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7201	200MHz MMX	32MB/3.0GB	12X	1899*
7161	166MHz MMX	32MB/2.4GB	12X	1999
7200	200MHz	16MB/3.0GB	8X	2199

Factory Refurbished

Infinia Monitors *Monitors priced separately*

Model	Size	View	Resolution	Price
Infinia	15"	13.78"	1280 x 1024	$459
Infinia	17"	16.23"	1280 x 1024	759

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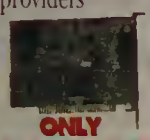

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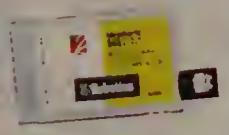

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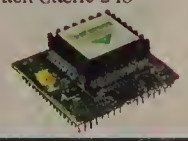

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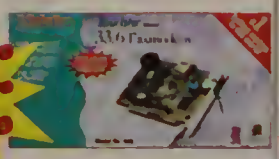

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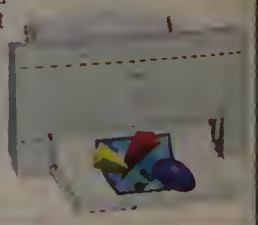

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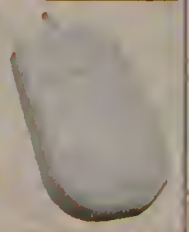

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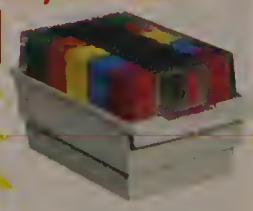

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Deskpro 6000 P-166 1.08G 16M 8x e-net	2090
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Vectra VE3 P-133 Workstation No HD	749
Vectra XA DT PP-200 32M Workstation 8X 10/100BT	2219
Vectra 525 MCX MT P-166MMX 24M 2.5GB 16X	1999
Vectra 525 CD MT P-200MMX 24M 2.5GB 16X	2149
Vectra 525 MCX MT P-200MMX 32M 3.8GB 16X	2699
IBM	
PC350 P-166 1.6G 16M	1749
PC365 PP-200 1.6G 64M 8X NT	2496

SERVERS

AST Servers	
Manhatten D, P-200MHz, 4G 32M	3479
Manhatten S PR200 2G 64M 10BT	5799
Compaq Servers	
Prolinat 800 PPro-180 4.3G 32M	3899
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Proliant 2500 P Pro200 4.3G 32M	6299
Hewlett Packard Servers	
Netserver LC, P-166 no HD, 32M	2499
Netserver LC, P-166 2.1G 32M	3399
[illegible]	[illegible]
IBM Servers	
PC Server 350 P-166 2.25G 32M 6xCD	CALL
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IBM Aptiva S78 P-166 3.2G 16M 6xCD	2289
SONY	
Vaio PCV-100 MMX-P166 2.5G 32M 28.8 16xCD	1899
Vaio PCV-120 MMX-P200 3.8G 32M, 28.8 16xCD	2249
TOSHIBA	
Equium 5160d P-166MMX 2.1GB 12X 32M	1876
Equium 5200D P-200MMX 2.5GB 12X 32M	2065
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3COM 3C900TPO PCI / 5-pack	109/509
3COMSuperstack II 12-port Hub 24-port Hub	509/847
Intel EtherExpress Pro 10+ Pro 10/100 PCI	89/209
Linksys EtherFast 10/100BT TX LAN	103
Linksys Workgroup Hub 10-port/20-port	105/186
Netgear EN104 4-prt 10BT Hub EN116 E-net 16-prt 10BT Hub	79
Novell NetWare 4.11 Intranetware 10-user	Call /1399
Xircom Creditcard IIPS Ethernet 10BT	132
Xircom Creditcard IIPS E-net COMBO 10BT/coax	169

VIDEO CAPTURE

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AITech Wavewatcher/TV2	280
All-in-Wonder (TV Tuner, Video Capture, & TV set display)	338
Creative Sharevision PC3000	389
Intel SmartVideo III/ Smart Video Pro	172/388
Sigma Reel Magic Ultra MPEG	339

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APC Back-UPS 900/1250	339/449
APC Back-UPS Pro 280/420/650	[illegible]
APC Smart-UPS 420VS/650VS 1000VS/1400VS	259/296/435/569
APC Smart-UPS 450/700 1400/2200	275/338/594/1029

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HEWLETT PACKARD	
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MICROTEK	
ScanMaker E3 w/Imagestar ScanMaker E6 Standard	185/319
POLAROID FILM SCANNERS	
Sprint Scan 35-LE / Sprint Scan 35ES	729/1499
UMAX	
Astra 1200S 600x1200 w/Photodeluxe	Just Announced
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MONITORS

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MicroScan 4V 15" 1280x1024 .28mm	299
MicroScan 5V 17" 1280x1024 .25mm	499
EIZO	
FlexScan TXC7S 17"	989
MAG INNOVISION	
DX1595 15" 1280x1024 .28mm	343
DX700T 17" 1280x1024 .25mm	649
MAGNAVOX	
7BM749 14" Mono 720x400	109
CM2099 14" 1024x768 .24mm	219
MV5011 15" 1024x768 .24mm (digital)	289
MB7000 17" 1280x1024 .24mm	519
CM5600 20" 1600x1280 .24mm (digital)	1029
MITSUBISHI	
Diamond Pro 91TXM 21" 1600x1200 .28	1471
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NEC	
Multisync M700 17" 1280x1024 .25mm	749
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CPD-100SX 15" 1280x1024 .25mm	367
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New! CPD-100VS 15" 1280x1024 w/Speakers	479
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GDM-17SE2T 17" 1600x1200 .25mm	829
CPD-300SFT 20" 1280x1024 .30mm TCO	1549
GDM-W900 24" 1920x1200 .25mm	4349
VIEWSONIC	
17EA 17" 1280x1024 .28mm w/speakers	589
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VISIONMASTER by IIYAMA	
MF-8617E 17" 1280x1024 .26mm	575
MT-9017E 17" .25 / MT 9021E 21" 1600x1200 .28	695/1415

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Creative Labs Awe 64 /Awe 64 Gold, 4MB	185/223
Creative Labs 12X Blaster/ Discovery 12X Kit w/SB 32	162/283
Altec Lansing ACS53 System w/subwoofer ACS500	125/299
Labtec 3210 20-watt Speakers	82
Panasonic EABMPC25 Speakers	45
Sony SRS-PC51 5W / SRS-PC91 10-watt	63/128
Creative Sound Blaster 16 Value IDE	89
Creative Sound Blaster 32 IDE PnP /64 AWE PnP	135/189

DIGITIZERS

Altek XGT 12X12 16button/ 12x18 16-btn	249/429
Wacom Artpad II 4x5 w/ Dabbler/12x12	149/409

MODEMS

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Simple Tech communicator simplejack 33.6	165
U.S. ROBOTICS	
Megahertz XJ4336 33.6 PC Card V.34(cellular capable)	228
Megahertz XJ4288 xJack 28.8 PC Card V.34	233
[illegible]	89
Sportster Voice x2 56K Faxmodem int./ext.	219/239
[illegible]	125/145
Sportster PCMCIA 2.1 28.8 w/fax V.34	199
Sportster x2 56K Faxmodem int./ext.	199/219

DRIVES

CD-ROM DRIVES	
Axonix 10X PCMCIA CD Drive	379
Microsolutions 4X Par /8X Par	189/269
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Panasonic KXL-783A 8X PCMCIA CD player	369
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Pinnacle Micro Vertex 2.6GB Kit / Apex 4.6G	1279/1499
Syquest EZ-Flyer 230 Par / Syjet 1.5GB int.	239/367
Seagate 4mm DAT 8GB int./ext.	849/949
Seagate Tapestor 3.2G ext. parallel	215
Seagate Tapestor 4G ext. SCSI	449
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Micropolis 1991W 9GB WSCSI-2	1243
Quantum Fireball 2.5GB FATA / Fireball TM 3.2G	265/329
Maxtor EIDE 3GB	275
Seagate Hawk ST32151N 2.1GB SCSI-2	509
Western Digital Caviar AC22100 2.1G / 3.1G	219/289

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Adaptec AHA-1520B/1540CP/ 2944UW	62/185/373
Adaptec AHA-2742 SCSI-2 EISA w/Flop Kit	345
Adaptec AHA-2940UW PCI SCSI-3 Master Kit	283
Boca IDE 2-HDD, 2-FDD IDE002	29

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ATI 3 Xpression 2MB DRAM PCI	96
ATI 3D Xpression 4MB PCI	127
ATI 3D Graphics XPression + PC2TV 2MB	129
Hercules Terminator 64 3D / 64/VIDEO 2MB	143/89
Jazz G-Force 3D 2M (64-bit 2D/3D Performance)	139
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CANON	
BJC-240/BJ-30 /BJC-70	179/255/299
BJC-4200/4550/BJC-620	262/451/365
EPSON	
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Stylus Color 600/ Stylus 800 1440dpi	288/419
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DeskJet 400 DeskJet 690C, 5ppm	179/289
DeskJet 820CXI 870CXI	385/479
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LaserJet 6P / LaserJet 6MP 8ppm 600dpi Pstscript	739/884
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Optra E Optra R+ Optra RN+ Optra LX+	484/1229/1469/1849
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8 x 36 32 mg	199 00	199 00
16 x 36 64 mg	489 00	489 00
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9 x 32 32 mg	169 00	168 00
19 x 32 64 mg	456 00	456 00
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INDUSTRY STANDARD DIMMS	16Mg	32Mg	64Mg	128Mg	256Mg
Unbuffered					
3 3V ECC, EDO	Call	Call	Call	Call	Call
3 3V EDO	Call	Call	Call	Call	Call
5 0V EDO	Call	Call	Call	Call	Call
5 0V FPM	Call	Call	Call	Call	Call
Buffered					
3 3V ECC EDO	Call	Call	Call	Call	Call
3 3V ECC FPM	Call	Call	Call	Call	Call

APPLE		
1 x 64	8Meg	48 00
2 x 64	16Meg	84 00
4 x 64	32Meg	175 00
8 x 64	64Meg	329 00
DELL OPTIPLEX GXPRO 200		
3 3V ECC, EDO	16Meg	119 00
3 3V ECC, EDO	32Meg	249 00
3 3V ECC,EDO 9/32chip	64Meg	479/845
3 3V ECC EDO	128Meg	1990 00
DELL POWER EDGE 2100 4100		
3 3V ECC, EDO	16Meg	119 00
3 3V	32Meg	249 00
3 3V 9/32 chip	64Meg	479/845
3 3V	128Meg	1990 00
3 3V	256Meg	3627 00
DELL 9 GATEWAY		
3 3V SDRAM	*8Meg*	*62 00*
3 3V SDRAM	*16Meg*	*119 00*
3 3V SDRAM	*32Meg*	*229 00*
3 3V SDRAM	*64Meg*	*460 00*
MOTOROLA (Apple Compatible)		
3 3V EDO	9Meg	54 00
3 3V EDO	16Meg	99 00
3 3V EDO	32Meg	197 00
3 3V EDO	64Meg	383 00

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Pentium Pro 72 Pin (install in pairs) / SIMMS

9Meg	59 00	64Meg	599 00
16Meg	119 00	128Meg	1206 00
32Meg	239 00		

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	60NS	70NS	80NS	100NS
256 x 9	-	9 89	9 00	5 00
1Meg x 9 (3 chip)	-	9 00	-	-
1Meg x 9 (9 chip)	17 00	17 00	12 00	18 00
4Meg x 9	33 00	33 00	33 00	-
16Meg x 9 (9 chip)	139 00	139 00	-	-

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256K (160pin) Async Coast Module $29 00

CACHE MEMORY

	12NS	15NS	20NS	25NS
32Kx8	9 00	4 50	4 25	4 00
32Kx8 (3 3V)		14 00	9 50	
64Kx?	-	11 00	9 ?0	9 00
64Kx8	-	15 00	5	-
128Kx8		29 50	26 00	24 00
32Kx8 SOJ 3 3V		12 00	11 00	9 00
128Kx8		89 00		
512Kx8	-		109 00	

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1Megx4			19 00	18 00	17 00
1Megx4 (Zip Pi)			12 00	11 00	8 00
256x4 Page Dip			7 25	9 75	6 50
256x4 Page Zip			9 25	9 00	9 95
256x4 Video Zip	-			10 95	9 95
256x8	-	-	17 00	11 00	-
256x16 SOJ	34 00	29 00	29 00	19 00	-
256x16 SOJ Edo	-		29 00	-	-
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NEC Powermate Pro 150 220	2Meg/6Meg WRAM	129 259
HP Vectra XV/6 VT/6 VA XA	2Meg/6Meg WRAM	129 259
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Ready 7022 (EDO pairs)	4Meg/8Meg/16Meg/32Meg	22/43/94/100
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PC 330 Models 6571-6578	4Meg/8Meg/16Meg/32Meg	24/49/99/169
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P/S 2 53 53LS, 58 57	4Meg/8Meg	39/69
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Thinkpad 700 720 750 CL57SX	4Meg/8Meg/16Meg/32Meg	39/79/159/268
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Presario 920 924 954 974 978 992	4Meg/8Meg/16Meg/32Meg	24/42/79/159
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Presario 7170 7180 9536 9546 9548 9564 (pairs)	4Meg/8Meg/16Meg/32Meg	24/42/79/159
Presario 9232 9234 9240 9250 9642 9660 (pairs)	4Meg/8Meg/16Meg/32Meg	24/42/79/159
Prolinea 1000 5/60 2000 R 4000 R (quads)	4Meg/8Meg/16Meg/32Meg	36/62/99/189
Prolinea 1500 1500R (pairs)	4Meg/8Meg/16Meg/32Meg	36/62/99/189
Prolinea 4500 4500R (quads)	4Meg/8Meg/16Meg/32Meg/64Meg	39/64/119/239/599
Prolinea 5000 5000R (pairs)	32Meg/64Meg/128Meg/256Meg	Call
Prolinea 4/25S 4/33 4/66	2Meg/4Meg/8Meg	29/39/69
Prolinea (enhanced) MT	4Meg/8Meg/16Meg/32Meg	36/62/99/189
Prolinea 575 590 5100 5120 5133 (pairs)	4Meg/8Meg/16Meg/32Meg	36/62/99/189
Prolinea 5100 5120 5133 5150 5166 (EDO pairs)	4Meg/8Meg/16Meg/32Meg	36/62/99/189
Prolinea 575E 100E 120E 575MX (pairs)	4Meg/8Meg/16Meg/32Meg	36/62/99/189
Prolinea 590MX 5120MX (pairs)	4Meg/8Meg/16Meg/32Meg	36/62/99/189
Prolinea 6150E 6180E (pairs)	8Meg/16Meg/32Meg	69/119/239
Prosignia 300 5/75 5/90 5/120 5/150 (pairs)	4Meg/8Meg/16Meg/32Meg	36/62/99/189
Prosignia 500 5/90 5/120 5/150 (pairs)	4Meg/8Meg/16Meg/32Meg	36/62/99/189

COMPAQ NOTEBOOK/LAPTOP MEMORY

Armada 1120 T 1125 1130 T	8Meg/16Meg/32Meg/64Meg	69/129/239/809
Armada 4110 4110 4120 4130 (pairs)	8Meg/16Meg/32Meg	69/129/239
Concerto 4/25 4/33	4Meg/8Meg/16Meg	49/79/139
Contura 4/25 C CX	4Meg/8Meg/16Meg	49/79/139
Contura 400C 400CX 410C 410CX	4Meg/8Meg/16Meg	49/79/139
Contura 420C 420CX 430C 430CX	4Meg/8Meg/16Meg/24Meg	49/79/139/199
Contura Aero 4/25 4/33	4Meg/8Meg/16Meg	39/79/109
LTE 5000 5100 5200 5300 5400	8Meg/16Meg/32Meg/64 Meg Kit	79/129/249/479
LTE Elite 440C CX 4/75CX	4Meg/8Meg/16Meg/24Meg	49/69/139/199
LTE Lite 4/25	4Meg/8Meg/16Meg	49/85/129
Presario 1000 1010 1020 1030 1070 1080	8Meg/16Meg/32Meg	59/109/199

DELL MEMORY

Dimension XPS M166S M2000 P133s 166s 200s P133v 166v 200v	8Meg/16Meg/32Meg	Call
Dimension XPS P60 P75 P90 P100	4Meg/8Meg/16Meg/32Meg	Call
Dimension XPS P100c 120c 133c 166c XPS P75T 100T (pairs)	4Meg/8Meg/16Meg/32Meg	Call
Dimension XPS P100c 120c 133c 166c XPS P75T 100T (pairs edo)	4Meg/8Meg/16Meg/32Meg	Call
Dimension XPS Pro 150 Pro 200 (quads)	4Meg/8Meg/16Meg/32Meg	Call
Dimension XPS Pro 150n 180n 200n (pairs edo)	4Meg/8Meg/16Meg/32Meg	Call

LASER PRINTER MEMORY UPGRADES

AMOUNT UPGRADED	OK 84	256k	1	2	3	3.5	4	5	6	9	19	32
Brother 630 631 641 645		-	39	49	-	-	-	-	-	-	-	-
Canon LBP 430		-	39		-		39					
Canon LBP 860 1260		-		19	-		39		-	69	69	179
Canon LBP4 4Lite 4plus			129	179	-		-		-	-	-	-
Epson Action Laser 1100 1600			19	29			59		-	89	99	
Epson Action Laser II		-	74		173			272	-	-		-
Epson 8000 800 4000 4100 4300			89		173			272		-		-
Epson 1000 1500 5000 5200	-	-		49			98			-		-
HP 2 2D-		-	-	59			79	-		-		-
HP 3 3D 3P 2P 2P+	-	-	-	*59*	-	-	*79*	-	-	-	-	-
HP 4 4M 4Si 4SiMX				19	-	-	49		-	79		
HP 4P 4PLUS 4MPm 1600 1600CM			9	19	-		39		-	69		-
HP 4L			29						-	-	-	
HP 3Si			9				39			69		
HP 5L			39	49			67			99	-	-
HP 5P 5MP 4V 4MV 6P 6MP	-	-	9	19			39			69	99	
HP Design Jet 600 650 200	-	-	-	19			39			69	109	199
HP Design Jet 700 750C Plus		-	-	-			29	-		49	89	179
HP Deskjet 500 500C 518 550 560	-	*29*	-	-	-	-	-	-	-	-	-	-
HP Deskjet 1200C 1200C/P				39	-		49	-	-	89	-	-
HP Paintjet XL300	54						69		-	144	299	-
IBM Laser 4019 4019E					-	109			-	-	-	-
IBM Laser 4029 4037		-					49			-	-	-
IBM Laser 4039 4079	-	-	-	*39*	-	-	*89*	-	-	*99*	-	-
Lexmark Medley 4C 4s 4SX		-	Call	Call	Call	-	-	-	-	-	-	-
Lexmark Optra L LX R RX		-	-			-	39	-	-	59	89	169
Lexmark Valuwriter 300 600			29	39		-	89	-	-	-	-	-
Lexmark Winwriter 200 400 600		-	29	39			89	-	-		-	-
NEC 90 290	-	-	-	89	-	-	-	-	-	-	-	-
NEC 95 97	-	-	-	59	-	-	-	-	-		-	-
Oki 400			-	59	-	-	-	-	-	-	-	-
Oki 400E 400EX 410E 410EX	-	-	87	89	189	-	189	-	-	-	-	-
Oki 810E EX 600E EX 610E EX	-		29	79	-	-	119	-	-	119	229	-
Oki 830 840			-	59	-	-	-	-	-	-	-	-
Panasonic 4420/4450I				79	-	-	109	-	-	-	-	-
Panasonic 4410/4430	-	-	-	*59*	-	-	*89*	-	-	-	-	-
Panasonic 4450	-	-	89	-	-	-		-	-	-	-	-
Panasonic 4400/5400	-	-	49	89	-	-	109	-	-	-	-	-
Panasonic 4440 5410	-	-	69	-	-	-	109	-	-	-	-	-
Panasonic 8500	-	-	14	29	-	-	79	-	-	-	-	-
Sharp 9400, 9460, 9600 9700E	-	-	49	69	-	-	119	-	-	-	-	-
Sharp 9500 E H 9700, H	-	-	49		-	-	238	-	-	-	-	-

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Compaq Aero, 400, 410, 420, 430	109	Sharp 8700, 8800, 8900	129
Compaq LTe 5000 Series	139	TI Exstensa 450, 455, 510, 515	139
Epson Action Note 650, 660	119	TI Exstensa 550, 555, 580, 570	149
Epson Action Note 800, 868, 880, 910	119	TI Exstensa 600, 605, 650	169
IBM Thinkpad 355 360	119	Toshiba 400, 405, 410, 415, 420, 425, 430 (NIMH)	219
IBM Thinkpad 365 C, ED, XD	129	Toshiba 100 105, 110, 115, 200, 205	105
IBM Thinkpad 701	109	Toshiba 2100 Series	99
IBM Thinkpad 750, 755	179	Toshiba 2400, 2450, 1900, 1950, 1960	109
IBM Thinkpad 755 CD, CE, CV, CX	179	Toshiba 4700, 4800, 4850, 4900	109
NEC Versa 2400, 2405, 2430, 2435	159	Toshiba T4500, T4600	159

TOSHIBA LAPTOP MEMORY

MODEL	AMT. UPGRADED	PRICE
Tecra 500/P650	*8Meg/16Meg/32Meg/48Meg/128Meg*	*79/118/209/369/599/1240*
Tecra 700 (SDRAM)	*8Meg/16Meg/32Meg*	*79/139/243*
Tecra 710, 720	*8Meg/16Meg/32Meg/64Meg/128Meg*	*79/129/229/849/1894*
Tecra 730 CDT, 730X CDT, 740 CDT	*8Meg/16Meg/32Meg/64Meg*	*Call*
T2000SXE/2200SX/T1800, 1850, C	8Meg	94 00
T2100 2105 2150, 2155, 2110, 2115	4Meg/8Meg/16Meg/24 Meg	39/59/129/189
T4500 C T4600, T4700, T1900, C, T1910, T1950 (3 3 v)	4Meg	39 00
T4500, C, T4600 T4700, T1900, C, T1910, T1950 (3 3 v)	8Meg	79 00
T4500 C, T4600 T4700, T1900, C, T1910, T1950 (3 3 v)	16Meg/32Meg	139/243
T3400CT T2400, T3600	4Meg/8Meg/16Meg/24Meg	59/79/149/199
T100, 105, 110, 115, 205, 210	*8Meg/16Meg/32Meg*	*79/129/229*
T400, 405, 410, 415, 420, 425, 430	*8Meg/18Meg/32Meg*	*70/129/229*
T400CS, 400CDT, T100, 105 Edo	*8Meg/18Meg/32Meg*	*79/129/229*
T600, 610 CT Edo, 660	8Meg/16Meg/32Meg	79/129/229

NOTEBOOK, LAPTOP MEMORY

MODEL	AMT. UPGRADED	PRICE
ACERNote 730C, 735C, 760C 760CX 780CX	2Meg/4Meg/8Meg	39/59/89
ACERNote 783, 785, 782, 784, 786	4Meg/8Meg/16Meg	49/69/129
ACERNote Light 350, 352 355	4Meg/8Meg/16Meg	49/69/129
ACERNote Light 358 358 359, 361 (pairs) edo	4Meg/8Meg/16Meg	49/69/129
ACERNote Neovo 971, 972	*8Meg/16Meg/32Meg*	*69/125/239*
ACERNote Pro 950, 954 955, 957, 959 (pairs)	4Meg/8Meg/16Meg	59/79/139
Ambra SN Series	4Meg/16 Meg	89/149
Ambra N-75 N 100	4Meg/8/16	49/79/139
AST Ascentie A41, A42	*8Meg/16Meg/32Meg/64Meg*	*79/139/320/875*
AST Ascentie P38, P50	*8Meg/16Meg/32Meg*	*79/149/269*
AST Ascentie J10, J30, J50	*8Meg/16Meg/32Meg/40Meg Kit*	*79/129/249/359*
AST Ascentia 900N 800N 810, 910	8Meg/16Meg	79/119
AST Ascentia 950	8Meg/16Meg	79/132
AST Brevo & Explorer	*4Meg/16Meg*	*79/149*
AT&T Globalyst 130 200 250	4Meg/8Meg/16Meg	49/79/129
Austin DX4 DX2, 5X2 5X Series	4Meg/16Meg	69/189
Austin Edge CD P-133 edo	*8Meg/16Meg*	*89/140*
Aestin Edge Duet (peirs) edo	*16Meg/32Meg*	*129/229*
Austin Viste	*4Meg/8Meg/16Meg/24Meg*	*49/79/129/190*
Canon 1100 (pairs)	4Meg/8Meg/16Meg	59/79/119
Canon Innova Book 150 175	4Meg/16Meg	59/139
Canon Innova Book 200LS	4Meg/8Meg/16Meg/24Meg	59/89/179/249
Cenon Innove Book 350CD, 360, 475	*8Meg/16Meg*	*59/120*
Cenon Innove Book 480, 490 edo	*8Meg/16Meg*	*89/149*
CTX EZ Book 500, 600 700 Pent, Series	*4Meg/8Meg/16Meg*	*59/89/139*
DEC HiNote	4Meg/8Meg/16Meg	59/89/139
DEC HiNote Ultra Ultra II	*4Meg/8Meg/16Meg*	*49/89/119*
DEC HiNote VP 520, 525, 535, 545	*8Meg/16Meg/32Meg*	*89/139/269*
DEC HiNote VP 5100, 5120	*8Meg/16Meg/32Meg/64Meg*	*79/139/219/899*
DEC HiNote VP, Css, LSS, CTS, LTS	*8Meg/18Meg/32Meg*	*79/139/269*
Dell Lettitede LM (peirs)	*4Meg/8Meg/16Meg*	*50/79/129*
Dell Latitude 433, C CX	4Meg/16Meg	89/149
Dell Latitude LX M	4Meg/8Meg/16Meg	59/89/139
Dell Latitude XP XPi	4 Meg/8Meg/16Meg	59/79/129
Epson ActionNote 650 650c 660c, 660cx	4Meg/8Meg/16Meg	39/79/139
Epson ActionNote 880, 866c 890 910	4Meg/8Meg/16Meg/20Meg	49/79/139/199
Epson ActionNote 4LC/25 4LC/33 4SLC/2-50, 4000	6Meg	69 00
Fejitse Lifebook 500 600 Series edo	*8Meg/16Meg/32Meg*	*89/139/289*
Fejitse Monte Carlo, Montego, Milan	*8Meg/16Meg/32Meg*	*69/139/269*
Gateway 2000 Colorbook 4/33	4Meg/16Meg	69/179
Gateway 2000 Nomad 425 DXL/SXL	4Meg/16Meg	140/559
Gateway 2000 486 Handbook or Liberty	4Meg/16Meg	49/139
Gateway 2000 Solo Series	4Meg/8Meg/16Meg	89/89/139
Gateway Solo Series 2100 2200 edo	8Meg/16Meg	89/139
Hitachi C-Series	*8Meg/16Meg/32Meg*	*79/129/229*
Hitachi E-Series, MX Series	*8Meg/16Meg/32Meg*	*79/139/269*
Hitechi M Series	*8Meg/18Meg/32Meg*	*69/119/249*
HP Omnibook 530 600	4Meg/8Meg/12Meg	49/69/99
HP Omnibook 800	8Meg/16Meg/32Meg	79/119/209
HP Omnibook 4000	4Meg/8Meg/16Meg	59/89/139
HP Omnibook 5000 5500	8Meg/18Meg/32Meg	69/119/219
Leading Edge Avriva 2000	16Meg	139
Micron Transport Pentium (pairs)	8Meg/16Meg	89/149
Midwest Micro Elite or Soundbook	4Meg/8Meg/16Meg	69/99/149
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NEC Versa S, Versa 2000C, D 2205C	4Meg/8Meg/16Meg	49/79/119
NEC Versa 4000 4050/4080 4200	4Meg/8Meg/16Meg/32Meg	59/79/139/299
NEC Versa 6000 6050, 6030	*8Meg/16Meg/32Meg/64Meg*	*69/139/229/Cell*
NEC Versa 6208MX ede	*8Meg/16Meg/32Meg/64Meg*	*69/139/229/Cell*
Olivetti Echos P/S-P1335 (pairs)	4Meg/8Meg/16Meg	59/89/149
Packard Bell Statesman	2Meg/8Meg	29/79
Panasonic CF V21P CF 580	4Meg/16Meg	49/139
Panasonic CF-V41	4Meg/8Meg/16Meg/32Meg	49/69/139/289
Seger Midern, ell models	*4Meg/8Meg/18Meg/32Meg*	*69/99/169/399*
Samsung Sens 810	8Meg/16Meg	79/139
Sceptre Soendx, ell models	*4Meg/8Meg/16Meg*	*49/89/149*
Sherp 3038, 3040, 3070	*8Meg/16Meg/32Meg*	*89/129/269*
Sharp 8150, 8650 8660, 7700, 7760	4Meg/16Meg	69/139
Sharp 8700 8800, 8900	4Meg/8Meg/16Meg	49/69/139
Sharp 3010 3020 3050 3060	4Meg/8Meg/16Meg/32Meg	49/69/129/269
Sharp 9000 9030	8Meg/16Meg/32Meg	69/119/239
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Sharp 9080 (pairs) edo	4Meg/8Meg/16Meg	49/79/129
Sharp Widenote 100T	8Meg/16Meg/32Meg	89/159/299
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TI Extensa, 510 515 (pairs) edo	4Meg/8Meg/16Meg	Call
TI Extensa, 550, 555, 560, 565, 570 (peirs)	*4Meg/8Meg/16Meg*	*49/89/139*
TI Extensa, 600, 605 650, 855, 665	8Meg/16Meg/32Meg	69/129/349
TI Extensa, 600, 605, 650, 900 T CDT edo	8Meg/16Meg/32Meg	Call
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Winbook XP5	32Meg	259
Zenith Z-Note MX	4Meg/8Meg/16Meg	69/89/139
Zenity Z-Note GT (pairs)	4Meg/8Meg/16Meg	59/89/129
Zenith Z-Star 4/33	2Meg/8Meg	29/79
Zenith Z-Stal EX, ES	*4Meg/8Meg/16Meg*	*59/89/139*

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Contura Series	Call	Call	Call
LTe 5000-5300	Call	Call	Call
FUJITSU	**1.08G**	**1.3G**	**2.1G**
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Lifebook Series			
IBM THINKPAD	**1.08G**	**1.3G**	**2.1G**
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750, C, CE, CS, P	Call	Call	Call
755, C, CO, CE, CS	Call	Call	Call
755, CSE, CV, CX	Call	Call	Call
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E, M, P, S, V	Call	Call	Call
PANASONIC		**1.3G**	**2.1G**
CF-V21P		Call	Call
CF-V41		Call	Call
SHARP		**1.3G**	**2.1G**
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8650, 8660, 8700		Call	Call
8800, 8900		Call	Call
TOSHIBA		**1.3G**	**2.1G**
100CS, 105CS, 110CS, CJ, 115CS		Call	Call
T1900, 1910, 1950, 1960		Call	Call
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T2135CS, CT, T2150CDS, CDT, CDS		Call	Call
T2400CS, CT, T2450, CT		Call	Call

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DIRT CHEAP DRIVES

1-800-637-4743

Celebrating our 10th year!
Low Low Prices!
We stock what we sell!

BEST BUY CD RECORDERS
TOLL FREE SUPPORT
5 FREE DISKS

2x6 SCSI CD ROM RECORDER
• Packet write compatible, tray loading

Drive Kit	$379
Complete Kit with ISA controller	$419
Complete Kit with PCI controller	$489

4x6 SCSI CD ROM RECORDER
• Packet write compatible, tray Loading

Drive Kit	$699
Complete Kit with ISA controller	$739
Complete Kit with PCI controller	$809

2x8 IDE CD ROM RECORDER
• Packet write compatible, tray Loading

Drive Kit	$409
Complete Kit with ISA controller	$439

NEW 2x6 SCSI CD ReWritable!
• CD-R and CD-RW compatible
• Includes 5 rewritable disks

Drive Kit	$699
Complete Kit with ISA controller	$739
Complete Kit with PCI controller	$809

(Drive kit - requires controller)

We will not be undersold on CD media!

	Alone	with CDR
CDR-74 (with jewel case)		
5 pack (CDR74-5)	$32	$29
20 pack (CDR74-20)	$105	$101
50 pack (CDR74-50)	$235	$230
100 pack (CDR74-100)	$459	$449
CDR-74 (no jewel case)		
50 disk spindle (CDR74S-50)	$225	$220
CDR-74W (ReWritable)		
5 pack (CDR74W-5)	$145	$135
20 pack (CDR74W-20)	$525	$515
50 pack (CDR74W-50)	$1229	$1209

Call for larger quantity pricing.

Converts any 3 1/2" hard drive into a removable drive. Great for transportability, data interchange, or security needs. Mount any 3.5" IDE or SCSI drive in the supplied cartridge, and the frame in a 5.25" drive bay in your computer and you are ready for transportability. Extremely high quality construction. Features built in cooling fan, SCSI ID switch.

		Extra frame	Extra cartridge
IDE	**$79**	**$49**	**$39**
SCSI	**$85**	**$54**	**$40**
WIDE SCSI	**$129**	**$75**	**$64**
Weather resistant cartridge carrying case			**$30**

High quality external storage solutions available in parallel or PCMCIA (type 2) interface.

Hard Drive	Parallel	PCMCIA
1.6G8	$319	$419
2.5G8	$369	$469
3G8	$439	$539
3.8GB	$479	$579
5G8	$599	$699
CD ROM		
12X	$259	$359
16X	$299	$399

1Gig JAZ SALE

iomega

Internal SCSI with 1 disk $295
External SCSI in our case with 1 disk $359
External SCSI in Iomega case with 1 disk $386
Disks Qty 2-4/5-9/10+ $87/$85/$82

IDE HARD DRIVES

IDE	*RPM*	*Brand*	*Model*	*Price*
1000MB	4103	JTS	JTS1000	$162
1200MB	5400	Fujitsu	M1636T	$179
1275MB	4500	Seagate	ST31276A	$185
12B0MB	4500	Quantum	TM312B0A	$186
12B1MB	5200	Western Digital	AC11200	$181
1300MB	4200	JTS	JTS1300	$169
1624MB	5200	Western Digital	AC21600	$199
1670MB	44B0	Maxtor	MB1750A	$195
1700MB	**5400**	**Fujitsu**	**M1623T**	**$188**
1700MB	4500	Seagate	ST31720A	$190
2100MB	4103	JTS	JTS2000	$188
2100MB	5400	Fujitsu	M1624T	$217
2100MB	5200	Western Digital	AC22100	$209
2132MB	4500	Seagate	ST32132A	$203
2151MB	5400	Quantum	FB32160A	$221
2168MB	4500	Quantum	TM32160A	$219
2187MB	4480	Maxtor	MB21B7A	$21B
2500MB	3600	Quantum	BF2500A	$215
2500MB	**5400**	**Fujitsu**	**M1638T**	**$215**
2559MB	5200	Western Digital	AC22500	$226
2560MB	5400	Seagate	ST52520A	$219
2560MB	5400	Maxtor	MB2560A	$219
2564MB	4500	Quantum	TM32550A	$245
3166MB	5200	Western Digital	AC33100	$248
3216MB	4500	Quantu	TM33200A	$273
3228MB	5400	Quantum	FB33240A	$270
3245MB	4500	Seagate	ST33240A	$278
3500M8	44B0	Maxtor	M83500A	$297
3860MB	**4500**	**Quantum**	**TM33840A**	**$308**
4000MB	5200	Western Digital	AC34000	$322
4310MB	5400	Quantum	FB34320A	$365
4326MB	4500	Seagate	ST34340A	$Call
4335MB	3600	Quantum	8F4335A	$249
5120MB	**5400**	**Maxtor**	**M85120A**	**$405**
6448MB	5400	Quantum	F836480A	$535
6450M8	5400	Seagate	ST56450A	$Call
6510MB	3600	Quantum	BF6510A	$369

SCSI HARD DRIVES

Add an Adaptec A2940Ukit PCI Ultra SCSI controller $249

SCSI	*RPM*	*Brand*	*Model*	*Price*
1050M8	5400	Seagate	ST31055N	$275
1280MB	4500	Quantum	TM31280S	$229
2110MB	4500	Quantum	TM32110S	$297
2150MB	5400	Seagate	ST52160N	$355
2150MB	7200	Seagate	ST32171N	$548
2151MB	5400	Quantum	FB32160S	$330
3228MB	5400	Quantum	FB33240S	$380
3254MB	4500	Quantum	TM33200S	$34B
4100MB	**7200**	**Micropolis**	**MC4341**	**$699**
4310MB	5400	Quantum	FB34320S	$479
4350MB	7200	Seagate	ST34371N	$835
4400M8	7200	Fujitsu	M2954S	$729
4550M8	7200	Micropolis	MC4345	$729
4550M8	7200	Micropolis	MC4345AV	$819
4550MB	7200	Quantum	XP34550S	$809
4550MB	10,000	Seagate	ST34501N	$1049
644BM8	5400	Quantum	FB36480S	$599
9100MB	**7200**	**Micropolis**	**MC3391**	**$1239**
9100MB	7200	Fujitsu	M2949S	$1269
9100MB	7200	Quantum	XP39100S	$1329
9100MB	7200	Micropolis	MC3391AV	$1339
9100MB	7200	Seagate	ST19171N	$1689
9100MB	10,000	Seagate	ST19101N	$3379
23300MB	5400	Seagate	ST423451N	$3809

WIDE HARD DRIVES

Add an Adaptec A2940UWKit PCI Ultra SCSI controller $280

WIDE	*RPM*	*Brand*	*Model*	*Price*
1050MB	5411	Seagate	ST31055W	$349
2149MB	5411	Seagate	ST32155W	$497
2150MB	7200	Seagate	ST32171W	$599
4294MB	**7200**	**Micropolis**	**MC3243W**	**$729**
4294MB	7200	Micropolis	MC3243WAV	$789
4350MB	7200	Seagate	ST34371W	$899
4400M8	7200	Fujitsu	M2954W	$749
4550MB	7200	Micropolis	MC4345W	$789
4550M8	7200	Micropolis	MC4345WAV	$849
4550M8	7200	Quantum	XP34550W	$839
4550MB	10,000	Seagate	ST34501W	$1109
9091MB	**5400**	**Micropolis**	**MC3391W**	**$1299**
9091MB	5400	Micropolis	MC3391WAV	$1399
9100M8	7200	Fujitsu	M2949W	$1309
9100MB	7200	Quantum	XP39100W	$1359
9100MB	7200	Seagate	ST19171W	$1789
9100MB	10,000	Seagate	ST19101W	$3479
23300MB	5400	Seagate	ST423451W	$3849

Hard Drive Cooling Fan Mounts in a 5 1/4 half height drive bay. Compatible with any 3 1/2" hard drive. Features twin cooling fans and a washable air filter. A must for 7200 and 10,000 RPM drives. (CHDFAN) $30

CD ROM DRIVES

IDE CD ROM

Speed	Brand	Model	ms	Int
8X	Mitsumi	CRMCFX800	150	$91
12X	Mitsumi	CRMCFX12X	150	$110
12X	Toshiba	XM57028	115	$104
16X	Lite On	LTN262A	120	$105
16X	Mitsumi	CRMCFX16X	120	$111
16X	Acer	AC706A	120	$109
16X	NEC	CDR1600	100	$125
16X	Toshiba	XM60028	90	$125
18X	Acer	AC616A	120	$135

IDE CD CHANGERS

Speed	Brand	Model	# Disks	Int
6X	NEC	CDR4X6	4	$99
8X	NEC	CDR4XB	4	$139

ACCESSORIES

Buy a CD drive & sound card & get a FREE audio cable.
Creative Labs Sound Blaster 16 Value PnP (SBIDE) $99
Creative Labs Sound Blaster AWE64 (SB64AWE) $1B0
Creative Labs Sound Blaster AWE64 (SB64AWEGOLD) $220
Professional speakers with 8ose style swivel speakers and separate subwoofer.
25 Watt (SPEAKERJR) $99 35 Watt (SPEAKERPRO) $129
Universal sound cable(AUDIOMIX) $9
Turn any IDE CD ROM into an external for parallel printer port (PPCASECD) $99
Turn any IDE CD ROM into an external for PCMCIA port (PCMCIACASECD) $189

SCSI CD ROM

Speed	Brand	Model	ms	Int
12X	Toshiba	XM5701B	115	$169
12X	Plextor	PX12TS(tray)	105	$219
12X	Plextor	PX12CS(caddy)	105	$269
15X	Toshiba	XM3B01B	99	$219
16X	NEC	CDR1610	100	$199
20X	Plextor	PX20TSE	95	$239

SCSI CD CHANGERS

Speed	Brand	Model	# Disks	
8X	Nakamichi	MJ4BS	4	$229
4X	Pioneer	DRM624X	6	$599

SCSI CD TOWERS

			4 Drive	7 Drive
12X	Toshiba	115ms	$1029	$1799
12X	Plextor	105ms	$1329	$2299
15X	Toshiba	99ms	$1399	$2429
16X	NEC	100ms	$1199	$1999
20X	Plextor	95ms	$1499	$2599

SCSI CD TOWERS w/ 4 Disc Changers

Nakamichi	8X	150ms	$1199	$2099

CD RECORDERS

Sony 2x6
Internal SCSI drive (CDU926S) $339

Yamaha 4x6
Internal SCSI drive tray load (YCDR400T) $639
Internal SCSI drive caddy load (YCDR400) $649

Philips 2x6 ($200 Philips rebate until 6/30/97)
Complete kit includes software, controller, and 1 disk
Internal SCSI (CDD2600) $670

Hewlett Packard SureStor 6020I
SureStor 6020I includes software, and 1 disk
Internal SCSI (C4343CDR) $450
Complete internal kit w/ controller (C4343CDR-1) $499
External for parallel printer port (C4345A) $569

Sony 2x8
Internal IDE (CDU92BS) $369
Kit w/ 1 disk, and software compatible with Win 95 & Win NT 3.51 & up. Req IDE controller. (CDU928SKIT) $409

Mitsumi 2x6
IDE Kit includes 3 disks, and software compatible with Win 95 & Win NT 3.51 and up. Requires IDE controller.
Internal (CRMC2600TE) $499

OTHER HARD DRIVES

2 1/2" IDE

1080M8	4200	Toshiba	MK1002MAV	$239
1400MB	4200	Toshiba	MK1401MAV	$299
2160MB	4200	Toshiba	MK2103MAV	$439
3080MB	4200	Toshiba	MK3303MAV	$679

SCA *Single Connector Attachment*

2150MB	7200	Seagate	ST32171WC	$699
4350MB	7200	Seagate	ST34371WC	$999
4550MB	10,000	Seagate	ST34501WC	$1179
9100MB	7200	Seagate	ST19171WC	$1859
9100MB	10,000	Seagate	ST19101WC	$3629

FC-AL *Fibre Channel - Arbitrated Loop*

4550M8	7200	Seagate	ST34572FC	$Call
4550MB	10,000	Seagate	ST19171FC	$1229
9100MB	7200	Seagate	ST19171FC	$2199
9100MB	10,000	Seagate	ST19101FC	$Call

We also stock: IDE and SCSI controllers, Media for all drives, Backup software, CDR mastering and encription software, CD Duplicators, CD Towers, Jukeboxes (CD, CDR, tape, optical), RAID controllers and cases, Drive Cases, CD Labeling systems, plus much more.

We also: Install any of these drives in external enclosures, and custom configure to your specifications.

TAPE DRIVES

EXABYTE

3.5-7Gig	8mm, 32MB/min, EXB8205XL	$1209
7-14Gig	8mm, 120MB/min, ELIANT820	$1579
7-14Gig	8mm, 60M8/min, EX88700LT	$735
7-14Gig	8mm, 60M8/min, EXBB700	$1069

(EXB8700 includes: 1 tape, 1 cleaning tape, and backup software)

20-40Gig	8mm, 360MB/min, EXBB900	$4329
70-140Gig	8mm, 60M8/min, EX810H	$4279

HEWLETT PACKARD

2Gig	DAT, 11MB/min, C1534AI	$589
2-4Gig	DAT-DC, 42MB/min, C1536AI	$629
4-8Gig	DDS-2 DAT, 60MB/min, C1599AI	$949
12-24Gig	DDS-3 DAT, 120MB/min, C1554AI	$1399
72-144GB	DDS-3 DAT, 120MB/min, C5648A	$3099

SEAGATE

2-4Gig	DAT-DC, 4BMB/min, C4324RP	$629
4Gig	Mini, 29MB/min, TST8000	$339
4-8Gig	DDS-2 DAT, 48MB/min, C4326NP	$759
48-96Gig	DDS-2 DAT, 48MB/min, C45B6NP	$1999

SEAGATE MINI CART
Prices include Dos/Win backup software & 1 tape

800M8	TR1, TSTB00R	$125	Parallel ver	$155
3.2Gig	TR3, TST3200	$195	Parallel ver	$225
4-8Gig	TR4, TST8000 IDE or SCSI			$349

SONY

4-8Gig	DDS-2 DAT, 44MB/min, SDT5000AI	$789
4-8Gig	DDS-2 DAT, 90MB/min, SDT7000AI	$869
12-24Gig	DDS-3 DAT, 144MB/min, SDT9000AI	$1129
32-64Gig	DDS-2 DAT, 90MB/min, TSL7000X	$2159

QUANTUM

15-30Gig	DLT, 150MB/min, DLT2000XT	$2799
20-40Gig	DLT, 180MB/min, DLT4000	$4269
75-150Gig	DLT loader, 150MB/min, DLT2500XT	$5149
100-200Gig	DLT loader, 180MB/min, DLT4500	$7259
105-210Gig	DLT loader, 150MB/min, DLT2700XT	$7299
140-280Gig	DLT loader, 180MB/min, DLT4700	$8999

REMOVABLE DRIVES

IOMEGA 100MB ZIP

Internal SCSI for PC (ZIP100I)	$148
Internal IDE for PC (ZIP100A)	$148
External SCSI for PC or Mac (ZIP100)	$148
External for PC parallel port (PPZIP100)	$148
100M8 disks (ZIP100C) Qty 2-9/Qty 10+	$18/$14

IOMEGA 1Gig JAZ

Internal SCSI with 1 disk (JAZI)	$295
External SCSI in our case with 1 disk (JAZEX)	$359
External SCSI in Iomega case with 1 disk (JAZX)	$386
Disks Qty 2-4/5-9/10+ 1Gig	$87/$B5/$82

SYQUEST 230MB Flyer

Ext. SCSI (EZ230S)	$239
Ext Parallel(EZ230PP)	$239
Extra Disks Qty 2-4/5-9/10+	$30/$26/$24

SYQUEST 1.5GB SyJet

Int. SCSI (SYJET1.5PCI)	$3B9
Ext SCSI (SYJET1.5PCX)	$4B9
Extra Disks Qty 2-4/5-9/10+	$100/$99/$9B

NEW HOT DRIVE NOMAI 750MB $CALL

OPTICAL DRIVES

FUJITSU
230MB •128MB compatible, 30ms, 3600rpm
Internal IDE w/ 1 free disk (M2541AC) $299
640MB • 230MB r/w & 128MB read compatible, 2MB buffer
Internal SCSI w/ 1 free disk (M2513A2WC) $439

MAXOPTIX
2.6Gig • (1.3Gig, 650MB r/w compatible) , 1M8 buffer
Internal SCSI (TAHITI2.6) $1569

TORAY
650MB • PD drive 650MB rewritable and 4X CD ROM in one.
SCSI Kit w/ controller & 1 disk Int (PWK650) $299

SMART STORAGE SOLUTIONS
4.6Gig •2.6Gig compatible, 19ms,
Internal SCSI & 1 disk (SSS4.6WC) $1449

Optical Disks (LIFETIME WARRANTY) 2-4/5-9/10+

128M8	[TJ128]	$20	$16	$14
230MB	[TJ230]	$20	$16	$14
540MB 3 1/2"	[TJ540]	$37	$33	$31
640MB 3 1/2"	[TJ640]	$38	$34	$32
1.2G8 512K	[TJ1.2]	$51	$47	$45
1.3G8 1024K	[TJ1.3]	$51	$47	$45
2.3G8 512K	[TJ2.3]	$69	$65	$63
2.6GB 1024K	[TJ2.6]	$69	$65	$63

M- F 8am - 8pm, Sat 9am - 3pm CST
24hr ordering at www.dirtcheapdrives.com

VISA MasterCard

We are a major supplier to Government, Educational, Fortune 1000, and Institutions. PO's and Bids accepted.

DIRT CHEAP DRIVES
3716 Timber Drive, Dickinson, Texas 77539
Local (281) 534-4140 - Fax (281) 534-6452

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7/97 PC World

Circle 147 on reader service card

CDW COMPUTER DISCOUNT WAREHOUSE

The right price.
The right advice.

"Get more"™

Memory Upgrades

AST

Ascentia P30, P50
8MB $109.20 72097 16MB $166.94 72098
Ascentia J50
8MB $82.65 68811 16MB $139.38 68809
32MB $249.30 68810

Cisco Systems

Router 3500, 2500 series
8MB $98.18 77730 16MB $139.22 77731

COMPAQ

Armada 1120
8MB $68.07 71879 16MB $125.02 71880
Armada 4110 series, 4120 series, 4130 series
8MB $83.36 74915 16MB $149.31 74917
32MB $278.09 74918
Deskpro 2000, 4000, 6000
8MB $63.54 74165 16MB $129.54 74166
32MB $239.76 74167
LTE Elite 5000 series
8MB $86.83 62465 16MB $149.31 62466
32MB $269.76 62467 64MB $577.66 62468
Proliant 2500
32MB $279.41 79833 64MB $904.25 79834
128MB $1229.41 79835
Proliant 5000, 5000R
64MB $589.94 71875 128MB $1064.45 71876
256MB $3666.06 71877 512MB $4838.72 71878
Presario 962, 9536, 9546, 9548, 972, 982, 974, 992,
Prolinea P75, P90
8MB $67.17 54679 16MB $108.36 54680
32MB $228.15 54682 64MB $474.54 54681
Presario 7200 series
8MB $59.48 68815 16MB $125.02 68812
32MB $235.94 68813 64MB $409.06 68814

FUJITSU

LifeBook 555TX, 655TX, 635T
8MB $73.29 83130 16MB $129.32 80765
32MB $396.60 80426

GATEWAY 2000

STG-Pent/P5-75, 90, 100, 120, 133, 150,
166 Family PC, P5-100, 120, 133, 150, 166 BestBuy
8MB $65.77 57571 16MB $125.02 57572
32MB $234.57 57573 64MB $459.91 57575
Solo V75 Deluxe, V90, S90,
S90 Deluxe, S90 BestBuy, Solo 2100
8MB $134.96 62795

HEWLETT® PACKARD

LaserJet 4 Plus, 4M Plus, 4MV, 4V,
5MP, 5P, 5si MX, 6P, 6MP
4MB $33.58 43306 8MB $62.97 42443
LasarJet 4, 4M
4MB $46.88 32151 8MB $88.91 32568
LaserJet 4si, 4si MX
4MB $41.48 43307 8MB $89.60 37583

HITACHI

MX series, 133T, 150T, 166T
8MB $99.61 85193 16MB $159.87 85195

IBM

PC 300 model 330, 340,
PC 700 model 730, 750 A, E, N, B, F, P
8MB $65.77 74840 16MB $125.02 72593
32MB $219.30 72594
ThinkPad 365E, 365ED
16MB $129.19 63579
ThinkPad 365, X, XD series, 560, 760 E, ED, EL, ELD
8MB $79.57 69680 16MB $129.32 69704
32MB $289.06 71913

IBM

ThinkPad 340, 345C, CS, 355, 360C,
CS, P, 755, CS, CE, CD, CV, CX
4MB $65.77 42715 8MB $97.24 42716
16MB $159.98 42717
ThinkPad 750, 750 C series, P
8MB $149.31 35181 16MB $184.47 35182
32MB $309.68 43310

NEC

Verse 6000, 6030 series, 6050 series
8MB $109.91 71586 16MB $159.24 71583
32MB $279.41 71584
Verse 2000 series
8MB $66.47 44184 16MB $129.88 44186
Verse 2400
8MB $65.51 76394 16MB $127.80 76396
Verse 2600
8MB $104.20 85753 16MB $174.91 85754
32MB $309.35 85755 64MB $709.94 85756
Verse 4000 series, E, V, M, P
4MB $81.28 30555 8MB $91.69 30557
12MB $138.01 43231 16MB $149.31 31342
20MB $189.31 43040 32MB $275.15 43041
Versa 6200MX, NT
16MB $147.89 85186 32MB $279.41 85192

Texas Instruments

Extensa 450 series, 550 series, 560 series, 570 series
8MB $71.54 59865 16MB $127.80 59866
Extense 510, 515
8MB $79.20 72130 16MB $129.91 72134
32MB $249.30 72136
TrsvelMete 5000 series, 5300
8MB $118.63 68609 16MB $169.69 68608
8MB piggyback modula $97.94 68610

TOSHIBA

Dynepsd T200, T200CS
8MB $81.97 31508 16MB $148.47 33132
Equium 5160D, 5200D, 6200D
8MB $65.06 87226 16MB $119.64 87227
Infinis 7130, 7160, 7200
8MB $86.19 76190 16MB $106.73 76191
Portega 650, 660, CDT, Tecra 500, 510 series, 730
series and 740 series
8MB $87.52 72535 16MB $129.54 72534
Portega 610, Tecra 710,720, 730 series,
Satellite Pro 200, 420, 430 series
8MB $79.95 67892 16MB $164.60 67893
32MB $299.36 67894
Satellite 100, 105, Satellite Pro 400, 410 series
8MB $97.24 63086 16MB $149.68 63087
32MB $289.98 61117
Satellite 110, 115, 200CDS, Satellite Pro 430CDT,
430CDS
8MB $79.95 67892 16MB $164.60 67893
32MB $299.36 67894
T2100, T2150
4MB $53.99 52810 8MB $77.79 52811
16MB $136.65 52812 24MB $204.57 52813
Tecra 510CDT, 510CDS
8MB $87.52 72535 16MB $129.54 72534
32MB $304.70 74695

STANDARD MEMORY

Standard Memory 72-pin, non-parity, 70ns
4MB (1x32) $36.34 47603 8MB (2x32) $63.67 47604
32MB (8x32) $195.01 47295 64MB (4x32) $464.99 62988

EDO memory same price as standard non-parity
Simple Technology memory upgrades are recognized and approved by leading computer manufacturers, including

Microsoft Windows Compatible · Mac OS · Simple Technology DEC Workstations memory upgrades

If you don't see it, call! CDW® carries Simple Technology's complete line of 1500 memory upgrade products for portables, workstations, servers, printers, desktop systems, PDAs and more. Memory pricing subject to change–please call your CDW account manager for the latest pricing and availability information.

Simple TECHNOLOGY®

Memory Upgrades

Every Simple Technology product is tested for 100% compatibility and is backed with a lifetime warranty.

LIFETIME WARRANTY · 100% COMPATIBLE

Each Simple Technology removable hard drive is pre-formatted with Ontrack Disk Manager (software included). Data transfer rate: 16.6Mbps. Guaranteed for one full year.

Model	Hard drive capacity 1.44GB	2.1GB	3.08GB
IBM ThinkPad 355, 360, 750, 755	$457.29 87497	$618.23 71582	$759.18 88867
IBM ThinkPad 760, C, CD, L, LD	$529.55 87498	$716.28 85087	—
Toshiba T4700, T4800, T4850	$389.46 87501	—	—
Toshiba T700, T710, T720	$389.46 87502	$564.08 71588	$768.49 89072
NCR Safari 3181 4/50, 3182 4/75	$439.30 87499	$608.07 71587	$735.56 88869
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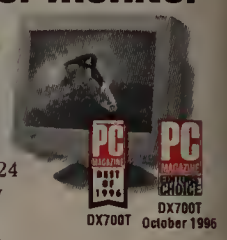

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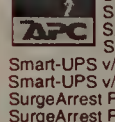

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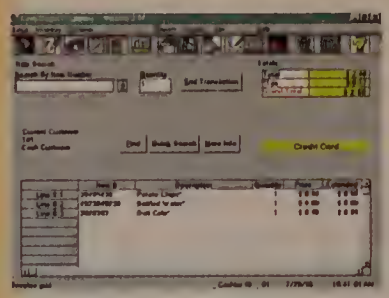

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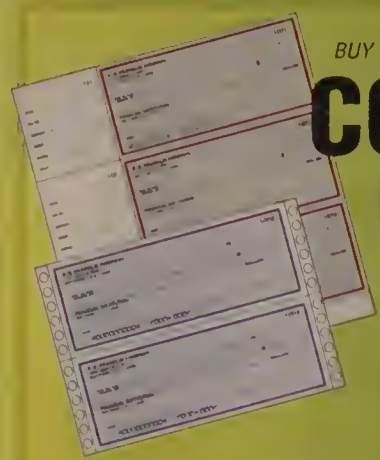

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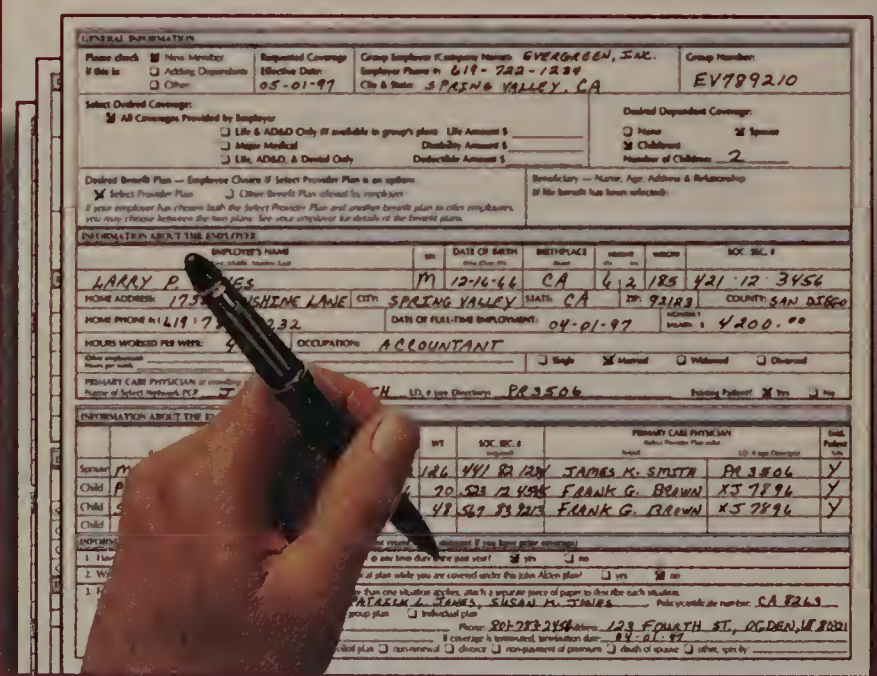

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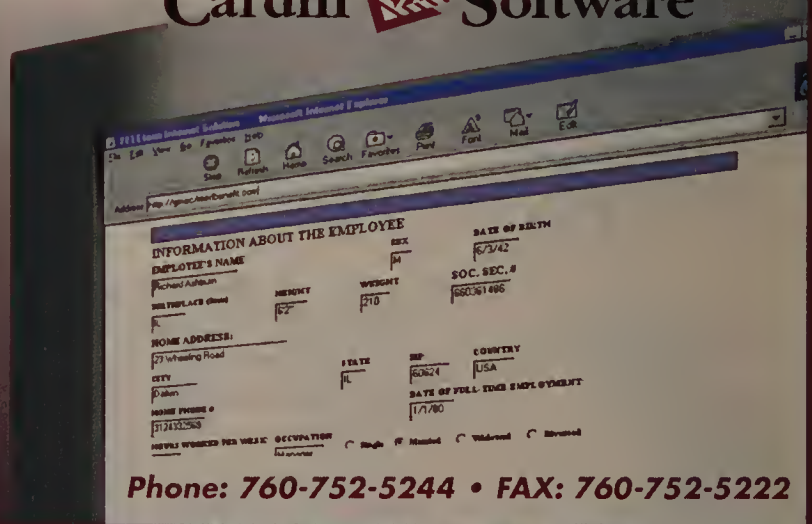

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IME 386SX
Imperial 3100
Imperial NB 486 3500
Inex 3000, 4000 NB series
Infotel TS30A, AC, AS, ES, M, P, 18
Infotel TS200AS, SoundBook
Infotel TS30E, EP, EPG, EH, CS SoundBook II
Infotel TS34X XC TS30LC
Infotel TS34X XC
Infotel TS38
Infotel Ultra 386SX
Insight 386SX/20
Intergrated Tech (ITC) P01-RA P02
Intelec NBSX20-40
IPC NB
Jetta 486/DX33
Jetta Interra, Jetbook 386SX, 386SX
Jetta Winbook
Kantec 386NB
Kantec NB (B1-200)
Keydata Keynote NB
Keydata Keynote
Keynote Keydata SKD-4000 NB
Kingtech KSN 386H, SX20
KLH 2600 NB
KLH 2500 NB
Kodak Diconix Printer 150 180si
Lap Pac 316EX
Laser 386SX/16
Laser LT321E
Leading Edge 386SX + 386SL25 Color
Leading Edge 386SX/16 386SX/20 325SLT
Leading Edge 486SLC DNE 2504 N3/SL25
Leading Edge N2050XL
Leading Edge DLT386SX, DLT386SX+
Leading Edge DNE 2045V 206SX 206FX 256SX
Leading Edge LEP 386SX/16 9142SX/20
Leading Edge LEP 386SX/20 9162SX/20 20
Leading Edge LEP 9500 9508 1, 9200BP
Leading Edge ONE 2SL
Leading Edge LEP9300 9208
Leading Edge LEP9600 9208
Leading Edge N3/SX N3/SX25 N3/SX25
Leading Edge NE (LEP9100 BP)
Leading Technology NB9600 NB9800
Leo Sport SX LT
Lexmark 5183 IBM Printer
Libra 286 386SX NSC3205NT
Libra NB
Libra T386SX
Librex V386SX V386XL
Logix PA
Loop Model 386
Lucky Bridge MB11A
Lynxs NB X AC TS39AT SoundBook II
Magitronic TS30A AC AS TS M P TS
Magitronic TS200AS SoundBook
Magitronic TS34X XC TS30LC
Magitronic TS34X
Magitronic TS34X XC
Magitronic TS38
Magitronic Pentium 75 66,800 series
Magnavox Metalis 286, 386 386SX
Matsushita Ultra 386SX
Memorex Telex 7500 LT
Micro Express NB5620
Micro Telesis Jetbook 386SX
Micronics NB
Micro D NB40
Midwest Micro TS30A AC AS ES M P TS
Midwest Micro TS200AS SoundBook
Midwest Micro TS34X XC TS30LC
Midwest Micro TS34X XC
Midwest Micro TS37 TS30V TS-A4 486/25
Subnote
Midwest Micro 386 NB 5620 5625
Mitac 3025D 3026D
Mitac 3026E
Mitac 5026 4020F 4020G 4028G
Mitsuba 286 Notebook
Mitsuba Ninja 12 CJA 386-12
Mitsuba Ninja 12 VGA LT
Mitsuba Ninja 286N 386SX/N 386NM
Mitsuba Ninja 486
Mitsuba Ninja 486SX/25 4S25CA 4S125CP
Mitsuba NoteStation 386SX
Mitsuba TS30A AC AS ES M P TS
Mitsuba TS200AS SoundBook
Mitsuba TS34X XC TS30LC
Mitsuba TS34X XC
Mitsuba TS38
NBCC NB
NCR 3120
NCR 3140
NCR 3150
NCR 3170 Safari NSX/20
NCR 3170SL 3180 3181 3182
NEC Multispeed
NEC Multispeed, Multispeed EL
NEC Prospect 386SX
NEC Prospect SX30
NEC Ultralite II
NEC Ultralite PC-27 81 SX/20
NEC Ultralite SL/20 SL/25C
NEC Ultralite Versa 20C 25C & E series
NEC Ultralite Versa S series
NEC Versa 2000 2200
NEC Versa 5500
NEC 4000
New MMI CMF NBSX20-40
New World Tech 486/33
New World Tech Mach 50 NB 486/50
Notable 386SX
NoteBook Computer Notebook PC
Novacom NB
Ocelot 3340DX 3380DX
Olivetti M 15, M-40
Outbound 125
Outbound 2000, 2030, 2030A
Packard Bell 286/386 Notebooks
Packard Bell 486 120
Packard Bell PB 386SL
Packard Bell Statesman
Packard Bell Statesman
Packard Bell Tell Notebook
Panasonic CF-170, 270, 370, 380
Panasonic Raven NB 386
Patriot KSN 386SX
PC Brand NB 386SX/20 386SX/18 386SX/20 386SX/25
PC & Research SLIC 386
Philips PC 320
Phoenix NB (Pen series)
Positive NB
Premier 8000
Premier 8000 NB Model 3800
Rainbow Notebook
Raven NB 386
RAG NB 386SX
Regal 386SX/20 Pentium 133
Sampo LT 386SX/16
Sampo NB386
Samsung 386SX/25 NB
Samsung LT Notebook
Samsung Notemaster 386S/20 386S/20
Samsung Notemaster 386S/20 386S/20 S3710
Samsung Notemaster 386S/25
Samsung SensLite 700 800 series
Sanyo 16SX MBC16LT MBC16LT2
Sanyo MBC-18NB
Sanyo 18NB
Sharp 2110 4500 4501 4502 4521
Sharp 4600 4641 4741 MZ-100 Sharp MZ-250
Sharp 6700 6800 6900
Sharp PC 6220 PC 6220
Sharp PC 6700 6781 5700
Sharp PC 6881 PC6881, PC6880
Sharp PC 8700 External Battery
Sharp PC 9000 9080 9100 9860 A3PC A650
Sharper 386SX/20
Standard NB 386SX/20
Standard Tech FTA 3212OSX
Star Micronics Star LS-48 Port Printer
Stealth 386SX/20 386SX/20
Surface Hyperbook 2300CLS 2300DLC
Surface Hyperbook 2200SX 2300CLC-33 Surface
Hyperbook 486SLC/25
Swan 386SX/16 386SX/20 386SX/25
Sysdata
Tandon 486SX 486SL/20 M4041
Tandon NB 386SX M4041 M4141
Tandon NB 386SX 486SLC
Tandy Prolite Notebook
Tandy 1000 HD 1400HD (new) 1400LT(old)
Tandy 1400HD (old) 1400HD
Tandy 1500HD 1800HD
Tandy 2810, 3800 3810 3820
Tandy 3810
Tandy 4800, 4860
Tandy 4800HD 4860HD
Tandy NB 386
Tandy Portable Printer
Tandy 386SX
Tandy 3800 3850
Tandy 3850
Tangent 320N
Target EL 386/25E
Teklon LT
Texas Instruments Extensa 450 450T 455 510 515
Texas Instr Extensa 600 605 650
Texas Instr Extensa 550 555 560 570 Texas
Instr LT286 LT386-25 LT386-45
Texas Instr Travelmate 2000
Texas Instr Travelmate 3000Win series
Texas Instr Travelmate 4000Win series
Texas Instruments Travelmate 3000 4000 4000E
Texas Instruments 4000M
Topcat Notepad 386SX
TopPC NB5820
Toshiba 200
Toshiba Satellite Pro 400 series
Toshiba T1000
Toshiba T1000SE/LE, T1200XE
Toshiba T1100+ T1100 T1200
Toshiba T1600
Toshiba T1800 11850 11850C Toshiba T1900
1950, 1960
Toshiba T2000 T2000SX T2000SCE
Toshiba T2100series
Toshiba Satellite 100 series
Toshiba T2200SX T3300SL
Toshiba T2200SX T3300SL
Toshiba T2400, 2450 satellite series
Toshiba T3 00SX
Toshiba 3600CT
Toshiba T4500 14500C 14600 14600C
Toshiba T4700 4800
Toshiba 4900 Satellite series
Toshiba Tecra 500, 510 series
Trac 364N 386N 386SX40
Twinhead 386SX NB
Twinhead 386SX Superlap
Twinhead 6120LX TX 8100CX
Twinhead Slimnote 386SXL 3SL/25
Twinhead Slimnote 486 486DX/33
Twinhead Slimnote 486 SX25 4DX/33
Twinhead Slimnote 4DX2/33 4SX/25
Twinhead Slimnote 486E DX2/50
Twinhead Slimnote SL3 5L5 series
Twinhead Supernote 286 386SX
Twin 386SX
Ultima SX20
Ultra 386SX/20 NB5620 NB5625
Ultra NB5500 386SL 386SX/25
Ultra TS30E SoundBook II
Ultra TS30A AC AS ES M P TS
Ultra TS200AS SoundBook
Ultra TS34X XL XC 486SLC25
Ultra TS34X XC DX33 Dx2/66
Ultra TS38
Unisys 386SL
US Logic A125 NT 1000
Vendata Executive 386S EL386S
Vendata ExtraPro 486
Victor 386PX 405N Notebook NB
Vitronic VK 286
Vortex 2040AX (new) 2040AX (old)
Vortex 3340DX 3380DX
Vortex Spectrum
Wang Model 1000
Win 386SX NB 208
WinBook XP XP5
Wyse 386SX/20N Decisionmate 486
Zenith 181 92
Zenith 181-93 181-97 183
Zenith 183 (High Capacity)
Zenith 184 97
Zenith Mastersport 286 386SX
Zenith Mastersport 386SL 425NL
Zenith Minisport Minisport HD
Zenith Supersport
Zenith Supersport 286 286E 386SX
Zenith Turbosport 386E
Zenith ZDS 620 N S
Zenith ZnoteFlex Znote MX
Zenith Zsport 386
Zenith Zslu 433VL
Zeos 386 plus 386SL/25 (008-0022)
Zeos 486 ColorNote
Zeos 4100
Zeos Contenda 386SL/25 (008-0022)
Zeos Freestyle 486SL
Zeos NB 286 386 386SX/20
Zeos Classic (599102 000)

AST MEMORY

MODEL	MEMORY	PRICE
Advantage 810 810, 818	4Meg 8Meg-16Meg 32Meg-64Meg	35-70-125-245-490
Advantage Adventura 4000	4Meg-16Meg	35-125
Advantage Adventure 6000	4Meg-8Meg-16Meg 32Meg-64Meg	35-20 125-245-470
Advantage Adventure 8000	4Meg-8Meg-16Meg-32Meg	30-60-120-220
Advantage Pro 486 SX33 SX25	4Meg-8Meg 16Meg 32Meg	30-60 120-220
Bravo LC	4Meg-8Meg 16Meg-32Meg	30-60 120-220
Bravo LC 5100 5133,5166 (EDO pairs)	4Meg-8Meg 16Meg-32Meg	35 70-125-245
Bravo MS	4Meg-8Meg 16Meg-32Meg	30-60 120-220
Bravo MS 5100 133 166 (EDO,pairs)	4Meg-8Meg 16Meg 32Meg	35-70-125-245
Bravo MS-T 8150 (pairs)	4Meg-8Meg 16Meg 32Meg	30-60-120-220
Manhattan G V (pairs)	8Meg-16Meg-32Meg	60-120-220
Premmia 4-33 4-50 MTE 433 (pairs)	4Meg-8Meg 16Meg-32Meg	35-70-125-248
Premmia 4-660 SE 4-33, 4-66 (pairs)	4Meg-8Meg 16Meg-32Meg	35-70-125-245
Premmia LX P-60 MX 4-66 P75	4Meg-8Meg-16Meg-32Meg	30-60-120-220

IBM MEMORY

MODEL	MEMORY	PRICE
Aptiva 300 500 Series	4Meg-8Meg-32Meg	30-60-120-220
Aptiva 700 Series (pairs)	4Meg-8Meg-16Meg 32Meg	30-60-120-220
Aptiva A Series (pairs)	4Meg-8Meg 16Meg-32Meg	30-60-120-220
Aptiva C Series (EDO,pairs)	4Meg 8Meg 16Meg-32Meg	30-60-120-220
Aptiva M Series	4Meg-8Meg-16Meg-32Meg	30-60-120-220
PC 330 Models 6571-6578	4Meg 8Meg 16Meg-32Meg	30-60-120-220
PC 330 Models 6577 (EDO,pairs)	4Meg 8Meg 16Meg-32Meg	30-60-120-220
PC 340 (EDO pairs)	4Meg 8Meg-16Meg-32Meg	30-60-120-220
PC 350 Models 6581-6585	4Meg-8Meg-16Meg-32Meg	30-60-120-220
PC 350 Model 6586 (pairs)	4Meg 8Meg-16Meg-32Meg	30-60-120-220
PC 350 Model 6587 (EDO pairs)	4Meg-8Meg 16Meg 32Meg	30-60-120-220
PC 360	4Meg-8Meg-16Meg 32Meg	30-60-120-220
PC 730 Models 6875-6876 (pairs)	4Meg-8Meg-16Meg-32Meg	35-70-125-245
PC 730 Model 6877 (EDO pairs)	4Meg 8Meg 16Meg 32Meg	30-60-120-220
PC 750 Models 6885-6886 (pairs)	4Meg-8Meg 16Meg 32Meg	35 70-125-245
PC 750 Model 6887 (EDO,pairs)	4Meg-8Meg 16Meg-32Meg	30-60-120-220
PC Server 310 (pairs)	4Meg-8Meg-16Meg 32Meg	35-70-125-245
PC server 500 (ECC pairs)	4Meg 8Meg-16Meg-32Meg	55-75-125-245
P-S 1 30 Pin Simms	1 Meg 4Meg	15 35
P-S 1 72 Pin Simms	4Meg-8Meg-16Meg 32Meg	35-70-125-245
P-S 2 55SX 85SX	4Meg	45
P-S 2 53 53LS 56 57	4Meg-8Meg	45-75
P-S 2 95XP (ECC pairs)	4Meg-8Meg-16Meg 32Meg	55-75-125 245
P-S Server 95 195 295 (ECC pairs)	4Meg-8Meg 16Meg-32Meg	55-75-125-245

IBM NOTEBOOK MEMORY

MODEL	MEMORY	PRICE
Thinkpad 360 345 355 C CE	4 Meg 8Meg-16Meg	80-80-160
Thinkpad 365C CS CD E EO	4Meg 16Meg	40-160
Thinkpad 365X 365XD	8Meg 16Meg 32Meg	80-160-295
Thinkpad 500 510CS	4Meg 8Meg 16Meg	60-80-160
Thinkpad 560	8Meg 16Meg 32Meg	80-160-295
Thinkpad 700 720 750 CL57SX	4Meg-8Meg 16Meg 32Meg	40-80-160 295
Thinkpad 201 701C	4Meg-8Meg 16Meg 32Meg	40-80 160-295
Thinkpad 7301 TS	4Meg 8Meg-16Meg	80-80 160
Thinkpad 755C CE CD CS	4Meg 8Meg 16Meg 32Meg	40-80-160-295
Thinkpad 760C CD LD	4Meg-8Meg 16Meg 32Meg	40-80-160 295
Thinkpad 760E ED EL ELD	8Meg 16Meg 32Meg	80-160-295

COMPAQ MEMORY

MODEL	MEMORY	PRICE
Deskpro 486-25 33L 50L	2Meg 8Meg 32Meg	30 95-245
Deskpro 3-25i 33i 4 25IS 66I	2Meg 4Meg-8Meg	30-65-95
Deskpro 386 486 M Series	2Meg 4Meg-8Meg	30-65 95
Deskpro M Series Expansion Board	(no memory)	110
Deskpro 450 4100 590 5100 5133	4Meg 8Meg 16Meg 32Meg	30-60-120-220
Deskpro 575 5120 5133 5150 5166 (EDO pairs)	4Meg-8Meg 16Meg 32Meg	30 60 120 220
Deskpro 2000 4000 6000 Series EDO pairs	4Meg-8Meg 16Meg 32Meg	30-60-120-220
Deskpro 5-60M 5-66M XE660 (quads)	4Meg-8Meg 16Meg 32Meg	30 60-120-220
Deskpro XL (pairs)	4Meg-8Meg 16Meg 32Meg	35 70-125 245
Deskpro XL 6150 6200 (ECC pairs)	8Meg 16-Meg-32Meg 64Meg 128Meg	CALL
Presario 510 520 524 660 720 724 880	4Meg 8Meg 16Meg 32Meg	30-60-120 220
Presario 920 924 954 974 978 982	4Meg 8Meg 16Meg 32Meg	30 60 120 220
Presario 833 850 860 866	4Meg 8Meg 16Meg 32Meg	35-70-125-245
Presario 9524 7110 7132	4Meg 8Meg 16Meg 32Meg	30 60 120-220
Presario 7170 7180 9536 9546 9548 9564 (pairs)	4Meg 8Meg 16Meg 32Meg	30-60-120 220
Presario 9232 9234 9240 9250 9642 9660 (pairs)	4Meg 8Meg 16Meg 32Meg	30 60 120-220
Proliant 1000 5-60 2000 R 4000 R (quads)	4Meg 8Meg 16Meg 32Meg	35-70-125-245
Proliant 1500 1500R (pairs)	4Meg 8Meg 16Meg 32Meg	35-70-125-245
Proliant 4500 4500R (quads)	4Meg-8Meg 16Meg 32Meg 64Meg	35 70-125-245-545
Proliant 5000 5000R (pairs)	32Meg 64Meg 128Meg 256Meg	CALL
Prolinea 4 25S 4 33 4-66	2Meg 8Meg 8Meg	30-45 70
Prolinea (enhanced) M1	4Meg-8Meg 16Meg 32Meg	35-70-125-245
Prolinea 575 590 5100 5120 5133 (pairs)	4Meg 8Meg 16Meg 32Meg	35-70-125 245
Prolinea 5100 5120 5133 5150 5166 (EDO pairs)	4Meg 8Meg 16Meg 32Meg	35-70-125-245
Prolinea 575E 100E 120E 575MD (pairs)	4Meg 8Meg 16Meg 32Meg	35-20-125-245
Prolinea 590MX 5120MX (pairs)	4Meg 8Meg 16Meg 32Meg	35-20-125-245
Prolinea 6150E 6180E (pairs)	8Meg 16Meg 32Meg	70-125-245
Prosignia 300 5 75 5-90 5-120 5-150 (pairs)	4Meg-8Meg 16Meg 32Meg	35-70-125-245
Prosignia 500 5-90 5-120 5 150 (pairs)	4Meg 8Meg 16Meg 32Meg	35-70-125-245

COMPAQ NOTEBOOK MEMORY

MODEL	MEMORY	PRICE
Armada 1120 T	8Meg 16Meg 32Meg 64Meg	115-195-Call-Call
Armada 4100 4110 4120 41 30	8Meg 16Meg 32Meg Kit	Call
Concerto 4-25 433	4Meg 8Meg 16Meg	75-95 185
Contura 4-25 C CX	4Meg 8Meg 16Meg	75 95 185
Contura 400C 400CX 410C 410CX	4Meg 8Meg 16Meg	75 95 185
Contura 420C 420CX 430C 430CX	8Meg 4Meg 16Meg 20Meg	45-75-165 235
Contura Aero 4 25 4 33	4Meg 8Meg 16Meg	75 95 185
LTE 500C 8100 520C 5300	8Meg 16Meg 32Meg 64Meg Kit	95-145 265-495
LTE Elite 4140C CX 4 75CX	4Meg 8Meg 16Meg 20Meg	45 75 165-235

TOSHIBA NOTEBOOK MEMORY

MODEL	MEMORY	PRICE
Tecra 500-P650	8Meg 16Meg 32Meg	80-160-295
Tecra 700 (SDRAM)	8Meg 16Meg 32Meg	80-160-295
Tecra 710 720	8Meg 16Meg 32Meg	80-160-295
1200OSXE-2200SX T1800 1850 C	8Meg	60
T2100 2105 2155 2110 2115	4Meg 8Meg 16Meg 24Meg	60-80-160-295
14500 C 14600 14700 T1900 T1910 T1950 (3.3v)	8Meg	80
14500 C 14600 14700 T1900 T1910 T1950 (3.3v)	8Meg	80
14500 C 14600 14700 T1900 T1910 T1950 (3.3v)	16Meg-32Meg	160-295
T3400CT T2400 T3600	8Meg 8Meg 16Meg 20Meg	80-80-160-245
T100 105 110 115	8Meg 16Meg 32Meg	80-160-295
T400 405 410 415 420 425	8Meg 16Meg 32Meg	80-160-295
T400CS 400CDT T100 105E00	8Meg 16Meg 32Meg	80-160-295
T600 610 CT EDO	8Meg 16Meg 32Meg	80-160-295

NOTEBOOK MEMORY

MODEL	MEMORY	PRICE
ACERNote 730C 735C 760C 780CX 780CX	2Meg-4Meg-8Meg	45-65-95
ACERNote 763 765 782 784 786	8Meg-8Meg 16Meg	56-75-156
ACERNote Light 350 352 355	4Meg-8Meg 16Meg	66-95-185
ACERNote Light 356 358, 359 361(pairs)	4Meg 8Meg 16Meg	66-95-185
ACERNote Pro 950 954 955 957 959(pairs)	4Meg-8Meg 16Meg	65-95-185

NOTEBOOK MEMORY

	MEMORY	PRICE
Ambra N Series	4Meg-8Meg-12Meg-16Meg	85-105-135-185
Ambra SN Series	4Meg 16Meg	75-175
Ambra N-75 N 100	4Meg-8Meg-16Meg	45-85-165
AST Ascentia P30, P50	8Meg 16Meg-32Meg	85-185-305
AST Ascentia J10, J30, J50	8Meg 16Meg 32Meg 40Meg	95-165-CALL-CALL
AST Ascentia 900N, 800N, 810 810	8Meg-16Me	95-185
AST Ascentia J10 J30, J50	8Meg-16Meg 32Meg 40Meg	95-185-CALL-CALL
ASTBravo & Explorer	4Meg-16Meg	75-215
AST Prem Exec 386SX-20-25-25L	4Meg	65
AST Power Exec 3-25, 425EL, 425SL	4Meg-16Meg	75-185
AST Power Exec 4-33SL	4Meg-16Meg	75-185
AT & T Globalyst 130, 200, 250	4Meg-8Meg-16Meg	65-95-145
Cannon Innova Book 150, 175	4Meg-16Meg	65-165
Cannon Innova Book 200LS	4Meg-8Meg-16Meg-20Meg	65-95-215-345
Cannon Innova Book 350CD 360 475	4Meg-16Meg	95-165
Cannon Innova 486 10	4Meg-16Meg	75-215
CTX EZ Book 5x86 Pent Series		CALL
DEC HiNote Ultra HiNote	4Meg 8Meg-16Meg	85-105-185
DEC HiNote VP	4Meg 8Meg-16Meg	85-105-185
DEC Latitude LM (pairs)	8Meg 16Meg-32Meg	85 185-295
DEC Latitude 433 C CX	4Meg 8Meg 16Meg	55 95-185
DEC Latitude LMP (pairs)	8Meg-16Meg	75-195
DEC Latitude LX M	4Meg 8Meg-16Meg	75-115-195
DEC Latitude XP XPI	4Meg 8Meg-16Meg	75-115-195
Epson ActionNote 850 850C 860C 880CX	4Meg-8Meg-16Meg	75-115-195
Epson ActionNote 700 700C 700CX	4Meg 8Meg-16Meg	89-109-189
Epson ActionNote 880 886C 890	4Meg-16Meg	75-185
Epson ActionNote 4LC-25 4LC-33 4SLC-2-50 400	4Meg-8Meg 16Meg-20Meg	56-85-155-195
Everex Tempo LX LX20 Carrier	6Meg	75
Fujitsu Monte Carlo	2Meg	85
Gateway 2000 Colorbook 4-33	8Meg-16Meg-32Meg	75-155-295
Gateway 2000 Nomad 425 DXL SXL	4Meg-16Meg	65-175
Gateway 2000 486 Handbook or Liberty	4Meg-16Meg	155-755
Gateway 2000 Solo Series	4Meg-16Meg	55-165
Gateway 2100 Solo Series	4Meg-8Meg 16Meg	75-105-195
Hitachi C Series	8Meg 16Meg-32Meg	CALL-CALL-CALL
Hitachi M Series	8Meg 8Meg-16Meg	75-105-195
HP Omnibook 300 480 425	8Meg 16Meg-32Meg	125-245-515
HP Omnibook 530 600	2Meg-4Meg	80-125
HP Omnibook 4000	4Meg 8Meg-12Meg	65-85-145
HP Omnibook 5000	4Meg 8Meg 11Meg	65-85-165
HP Omnibook 6000	8Meg 16Meg-32Meg	85-165-315
	8Meg-8Meg	65-110
Leading Edge 4 4ne 2000	4Meg-16Meg	65-175
Lexmark SE10	8Meg-8Meg	75-115
Magnavox Metalis	4Meg	115
Micron Transport Pentium	8Meg-16Meg	115-215
Midwest Micro Elite or Soundbook	4Meg 8Meg 16Meg	75-115-195
Midwest Micro Elite or Soundbook Plus or Soundbook II	4Meg 8Meg 16Meg	75-115-195
Midwest Micro Elite or Soundbook CD	4Meg 8Meg-16Meg	75-115-195
NCR Safari 3180, 3181	4Meg-8Meg	75-115
NEC Ultralite Versa E, V, MP	8Meg-8Meg-16Meg-20Meg	80-95-195-295
NEC Versa 8 Versa 2000 & 2000D 500	4Meg-8Meg 16Meg	55-95-185
NEC Versa 4000 4050-4080	8Meg 8Meg 16Meg-32Meg	85-95-165-295
NEC Versa 6000	8Meg 16Meg-32Meg	165-295-335
Olivetti Philos P75-P133S (pairs)	4Meg-8Meg-16Meg	85-125-215
Packard Bell 386SX 286	4Meg	85
Packard Bell Statesman	2Meg-8Meg	45-95
Panasonic CF V21P CF 580	4Meg 16Meg	65-165
Panasonic CF-V41	4Meg 8Meg-16Meg-32Meg	75-115-215-365
Samsung Sens 810	8Meg-16Meg	CALL
Sanyo 17 18 NB	2Meg	85
Sharp 3030 3070	8Meg-16Meg-32Meg	105-175-345
Sharp 6781 6881 6785 6700 6800 6741	2Meg-4Meg	75-125
Sharp 6750 6850 8880 7700 7780	4Meg-16Meg	65-185
Sharp 8700 8400 8900	4Meg-8Meg 16Meg	65-105-185
Sharp 3010 3020 3050 3090	4Meg-8Meg 16Meg	85-105-185
Sharp 9000 9080	8Meg 16Meg-32Meg	75-185-295
Sharp 6040 9070 (pairs)	8Meg-16Meg 32Meg	85-125-265-525
TI 4000 4000E 4000M	8Meg 16Meg	140-715
TI 5000 5100 5200 5300	8Meg 16Meg	95-195
TI 6020 6030	8Meg 16Meg 32Meg	215-395-CALL
TI Extensa 450 450T 455 455T 520	4Meg 8Meg 16Meg	55-95-185
TI Extensa 550 555 560 560 (pairs)	4Meg 8Meg 16Meg	55-95-185
Winbook XP	8Meg 32Meg	CALL
Zenith Master Sport SL NE 600 620 625NL	2Meg	85
Zenith Z Note 425LN LNC LNP	4Meg	85
Zenith Z Note MX	4Meg 8Meg 16Meg	95-95-175
Zenith Z Star 4 33	2Meg-4Meg	45-95
Zenith Z Star EX	4Meg 8Meg 16Meg	56-105-185

LASER PRINTER MEMORY

(Table of laser printer memory upgrades by amount upgraded: 0K/256K/512K, 1, 2, 3, 3.5, 4, 5, 6, 8, 10, 32 — [illegible])

DELL DESKTOPS & TOWER PC'S

MODEL	MODULE/KITS	PRICE
PowerLine Workstations (all models)	8MB	90
	16MB	164
	32MB	2?8
PowerEdge SP (all models)	8MB	64
PowerEdge XE Pentium (all models)	16MB	128
OmniPlex 560/ME	32MB	260
OmniPlex 566/ME	64MB	462
OmniPlex 590/ME		
PowerEdge XE 466	4MB	34
PowerEdge XE 450	8MB	64
PowerEdge XE 433	16MB	130
PowerEdge XE 433s	32MB	231
OmniPlex ME Series		
System 433TE	8MB	90
System 425TE	16MB	164
OptiPlex GXi Series (Pentium)	8MB	65
	16MB	128
	32MB	260
	64MB	462
OptiPlex G & GX Series (Pentium)	8MB EDO	87
	16MB EDO	133
	32MB EDO	259
	64MB EDO	470
Low Profile Power Desktop (all)	4MB	45
Power Desktop (all models)	16MB	149
OptiPlex 4100/e	4MB	34
OptiPlex 466/e	16MB	130
OptiPlex 450/e 433/3 OptiPlex V Series (all models)		
Dimension & Dimension XPS Series (Pentium)	4MB	32
	8MB	61
* installed in pairs	16MB	123
	32MB	210
	4MB EDO	32
	8MB EDO	63
	16MB EDO	123
Laptop and Notebook PC's		
Latitude XPi (Pentium)	4MB Module	50
Latitude XP (486)	8MB Module	89
	16MB Module	162
Latitude LX (486)	4MB Module	89
	8MB Module	130
	16MB Module	239
Latitude 433mc 450mc	4MB Module	89
Latitude 450mcx	8MB Module	99
Latitude 433m	16MB Module	199
Latitude 433, 433c, 433cx	4MB Kit	89
	16MB Kit	210

DIGITAL DESKTOPS & TOWER PC'S

MODEL	MODULE/KITS	PRICE
DECpc MTE (all models)	4MB Module	45
Priorls MTE (all models)	16MB Module	149
DECpc MT (all models)		
DECpc LP LPx,LPx+ (all models)		
Venturis Series (Pentium)	4MB Module	34
* installed in pairs	8MB Module	64
	16MB Module	130
	32MB Module	231
Celebris Series (Pentium)	4MB Module	34
* installed in pairs	8MB Module	64
	16MB Module	130
	32MB Module	231
Celebris XL Series (Pentium)	8MB	Call
	16MB	Call
	32MB	Call
	64MB	Call
Celebris GL & GLST Series (Pentium)	4MB EDO	32
* installed in pairs	8MB EDO	63
	16MB EDO	123
	32MB EDO	223
	2MB WRAM Video	147
	6MB WRAM Video	387
Venturis 560 4100 466,450s2 433	8MB Module	34
	8MB Module	64
	16MB Module	130
	32MB Module	231

DIGITAL NOTEBOOK PC'S

MODEL	MODULE/KITS	PRICE
HiNote VP (Pentium)	4MB EDO	[illegible]
	16MB EDO	[illegible]
	32MB EDO	[illegible]
HiNote Ultra II (Pentium)	4MB Module	59
	8MB Module	[illegible]
	16MB Module	1?2
HiNote Ultra (all models)	4MB 8MB Module	59 89
	16MB Module	162
HiNote 486DX4/75	4MB Module	59
HiNote 486DX2 50	8MB Module	89
HiNote 486 DX 33	16MB Module	162

DIGITAL NOTEBOOK PC'S

MODEL	MODULE/KITS	PRICE
HiNote VP (Pentium)	8MB EDO	109
HiNote VP (Pentium)	8MB EDO	109

GATEWAY 2000 DESKTOP

MODEL	MODULE/KITS	PRICE
Destination Big Screen PC's	4MB 8MB Module	32 63
	16MB 32MB EDO Module	123 223
P5-166XL P5-166	4MB 8MB Module EDO	32 63
P5-150 P5-133 P5 120	16MB 32MB Module EDO	123-223
P5-75 Family PC P5-75 100 120 133		

HEWLETT PACKARD DESKTOP

MODEL	MODULE/KITS	PRICE
Pavilion Series (Pentium)	4MB Module	34
* installed in pairs	8MB Module	64
	16MB Module	130
	32MB Module	231
NetServer LF (all models)	4MB Module	45
NetServer LM (all models)	8MB Module	82
NetServer LM2 (all models)	16MB Module	149
NetServer LC Series (all models)	32MB Module	231
Vectra XP/60		
Vectra VL2 Pentium (all models)		
NetServer LE Series 486DX 33	4MB Module	45
NetServer LE Series 486SX 33	8MB Module	82
NetServer LE Series 486DX 66	16MB Module	149
NetServer 4/33 LM	32MB Module	231
Vectra VE 4 & XM3 Series	4MB Module	34
* installed in pairs (XM3 Series)	8MB Module	64
	16MB Module	130
	32MB Module	231
Vectra VE/5 VL4 & XM4 Series	4MB EDO Module	32
* installed in pairs	8MB EDO Module	63
	16MB EDO Module	123
	32MB EDO Module	223
Vectra XU 5/100	4MB Module	34
Vectra XU 5/90C (GX)	8MB Module	64
Vectra XU 5/90	16MB Module	130
Vectra XM3	32MB Module	231
Vectra VL3		
Vectra M2 (all models)	4MB Module	34
Vectra N2 (all models)	8MB Module	64
Vectra XM2 (all models)	16MB Module	130
Vectra VL2 486 (all models)	32MB Module	231
Vectra EM Series (all models)	4MB Module	45
Vectra ST (all models)	8MB Module	82
	16MB Module	140
Vectra PC (all models)	8MB Module	82
	512MB VRAM Kit	40
Vectra 486 PC	4MB Module	45
	8MB Module	82
Vectra 486/33T	4MB Module	45
Vectra 486/25T	8MB Module	82
	512MB VRAM Kit	49
Vectra N (all models)	4MB Module	45
Vectra M (all models)	8MB Module	82
Vectra NI (all models)	16MB Module	140
Vectra 486/66VL	4MB Module	45
Vectra 486/33VL	8MB Module	82
Vectra 486/25VL	16MB Module	149

HEWLETT PACKARD NOTEBOOK

MODEL	MODULE/KITS	PRICE
OmniBook 5000 Series	6MB-16MB Module	109-199
OmniBook 4000 (all models)	32MB Module	389
OmniBook 600C (all models)	8MB 16MB Module	109 299
	4MB 8MB Module	69 118

MICRON DESKTOPS & TOWER PC'S

MODEL	MODULE/KITS	PRICE
Pro 166 Magnum	4MB Module	34
P5 200 Magnum Plus	8MB Module	64
P133 PowerServer SMP	16MB Module	123
P266 PowerServer SMP	32MB Module	219
4 00 PC Magnum		
P150PC Millennia	4MB Modules	32
P166PC Millennia Plus	8MB Module EDO	63
P75 PowerStation	16MB Module EDO	123
P100 PowerStation P100 Home MPC	32MB Module EDO	223
P150 Home MPC Pro		

NEC DESKTOPS & TOWER PC'S

MODEL	MODULE/KITS	PRICE
Image Pentium (all models)	4MB Module	45
Image 4100m 4100es	8MB Module	82
Image 466es 450es 433es	16MB Module	149
PowerMate Express 9 all models	32MB Module	231
PowerMate Express 486/66Ta	4MB Module	45
PowerMate Express 486/50 & 486SX/25Ti	16MB Module	149
PowerMate Express 486 5e 6de		
PowerMate V Server 1466 & Pentium	4MB Module	34
* installed in pairs on Pentium systems	8MB Module	64
	16MB Module	130
	32MB Module	231
Power Mate Express 486/50e 486SX/25e	4MB Module	45
Power Mate Express 486SX 20e		
Image 466 433 425	4MB Module	45
PowerMate 477es 433es 425es	16MB Module	149
Ready 466es 4 3es 425es		
PowerMate P60M	4MB Module	34
Ready P60M	8MB Module	64
PowerMate 4100M 466M 466D	16MB Module	130
PowerMate 466M	32MB Module	231
Ready 4100M 466m 466D 4330		
PowerMate P600		
PowerMate 466 433 425	4MB Module	45
Ready 433 425	16MB Module	149

NEC NOTEBOOK PC'S

MODEL	MODULE/KITS	PRICE
UltraLite SL/25C	2MB 4MB Module	99-167
	8MB Module	299
UltraLite SL/20	2MB Module	98
UltraLite SL/20P	6MB Module	199
Versa V (all models)	4MB Credit Card	79
Versa P (all models)	8MB Credit Card	99
Versa M (all models)	16MB Credit Card	169
Versa 4000 4050 4080 4200	32MB Credit Card	299
Versa S (all models)	4MB Module	80
Versa 2000 2200C 2205 2400CD	8MB Module	94
Versa 500 550	16MB Module	162
Versa 6000 (Pentium) Models	8MB 16MB Credit Card	118 199
	32MB Credit Card	409

NEC PRINTERS

MODEL	MODULE/KITS	PRICE
SilentWriter Model 95, 95b, 97 97b	2MB Module	79
SilentWriter 2 Model 290	2MB Module	80
SilentWriter 2 Model 90 Vectra MI (all models)		

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MOTHERBOARD SPECIALS

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		MOTHERBOARD	MOTHERBOARD WITH CPU
PENTIUM-75 PROCESSOR	3-PCI, 3-ISA, 512K PIPELINE, 5 PCI-ISA SHARED FLASH BIOS, 4-72 PIN, UP TO 128MB RAM	125	$200
PENTIUM-90 PROCESSOR	3-PCI, 3-ISA, 512K PIPELINE, 5 PCI-ISA SHARED FLASH BIOS, 4-72 PIN, UP TO 128MB RAM	125	220
PENTIUM-100 PROCESSOR	3-PCI, 3-ISA, 512K PIPELINE, 1 PCI-ISA SHARED FLASH BIOS 4-72 PIN, UP TO 128MB RAM	125	230
PENTIUM-120 PROCESSOR	3-PCI, 3-ISA, 512K PIPELINE, 1 PCI-ISA SHARED FLASH BIOS, 4-72 PIN, UP TO 128MB RAM	125	240
PENTIUM-133 PROCESSOR	3-PCI, 3-ISA, 512K PIPELINE, 1 PCI-ISA SHARED FLASH BIOS, 4-72 PIN, UP TO 128MB RAM	125	275
PENTIUM-150 PROCESSOR	3-PCI, 3-ISA, 512K PIPELINE, 5 PCI-ISA SHARED FLASH BIOS, 4-72 PIN, UP TO 128MB RAM	125	300
PENTIUM-166 PROCESSOR	3-PCI, 3-ISA, 512K PIPELINE, 1 PCI-ISA SHARED FLASH BIOS, 4-72 PIN, UP TO 128MB RAM	125	365
PENTIUM-200 PROCESSOR	3-PCI, 3-ISA, 512K PIPELINE, 1 PCI-ISA SHARED FLASH BIOS, 4-72 PIN, UP TO 128MB RAM	125	420
MMX-166 PROCESSOR	3-PCI, 3-ISA, 512K PIPELINE, 5 PCI-ISA SHARED FLASH BIOS, 4-72 PIN, UP TO 128MB RAM	125	440
MMX-200 PROCESSOR	3-PCI, 3-ISA, 512K PIPELINE, 1 PCI-ISA SHARED FLASH BIOS, 4-72 PIN, UP TO 128MB RAM	125	675
CYRIX-166 PROCESSOR	3-PCI, 3-ISA, 512K PIPELINE, 1 PCI-ISA SHARED FLASH BIOS, 4-72 PIN, UP TO 128MB RAM	125	250
CYRIX-200 PROCESSOR	3-PCI, 3-ISA, 512K PIPELINE, 1 PCI-ISA SHARED FLASH BIOS, 4-72 PIN, UP TO 128MB RAM	125	300
INTEL 486DX2-66	256C VLB, 7-ISA, 2-VLB, 8-30 PIN OR 4-30 PIN, & 2-72 PIN OR 4-72 PIN, 8-30 PIN & 2-72 PIN ENHANCED BIOS	120	155
INTEL 486DX4-100	256C VLB, 7-ISA, 2-VLB, 8-30 PIN OR 4-30 PIN, & 2-72 PIN OR 4-72 PIN, 8-30 PIN & 2-72 PIN ENHANCED BIOS	120	175
AMD 386DX-40	128C, 8-ISA, 128KC, 8-30 PIN	NA	100
AMD 486DX4-100	256C VLB, 7-ISA, 2-VLB, 8-30 PIN OR 4-30 PIN, & 2-72 PIN OR 4-72 PIN, 8-30 PIN & 2-72 PIN ENHANCED BIOS	120	140
AMD 486DX4-133	256C VLB, 7-ISA, 2-VLB, 8-30 PIN OR 4-30 PIN, & 2-72 PIN OR 4-72 PIN, 8-30 PIN & 2-72 PIN ENHANCED BIOS	120	150

SIMMS LIFETIME WARRANTY

30 PIN NON-PARITY/8 BIT	
1MB X 8-80NS SIMM	$15
1MB X 8-70NS SIMM	15
4MB X 8-80NS SIMM	35
4MB X 8-70NS SIMM	35
4MB X 8-60NS SIMM	35
30 PIN 8 BIT SIPPS	
1MB X 8-100NS SIPP	25
1MB X 8-80NS SIPP	25
1MB X 8-70NS SIPP	25
1MB X 8-60NS SIPP	25
256K X 8-70NS SIPP	15
30 PIN PARITY/9 BIT	
4MB X 9-70NS SIMM 3 CHIP	35
4MB X 9-80NS SIMM 3 CHIP	35
4MB X9-80NS SIMM 3 CHIP LOGIC	30
4MB X9-70NS SIMM 3 CHIP LOGIC	30
4MB X 9-80NS SIMM 9 CHIP	35
4MB X 9-70NS SIMM 9 CHIP	35
4MB X 9-60NS SIMM 9 CHIP	35
1MB X 9-100NS 9 CHIP SIMM	10
1MB X 9-80NS 3 CHIP SIMM	10
1MB X 9-80NS 9 CHIP SIMM	15
1MB X 9-70NS 3 CHIP SIMM	15
1MB X 9-70NS 9 CHIP SIMM	20
1MB X 9-60NS 3 CHIP SIMM	15
1MB X 9-60NS 9 CHIP SIMM	20
16MB X 9-70NS/60NS SIMM	160
256K X 9-80NS/70NS SIMM	10
72 PIN MEMORY	
256 X 36-1MB-70NS	20
512 X 36-2MB-70NS	30
512 X 36-2MB-60NS	30
1X36-4MB-70NS/60NS LOGIC	30
1X36-4MB-70NS/60NS MAJOR	35
2X36-8MB-70NS/60NS LOGIC	40
2X36-8MB-70NS/60NS MAJOR	50
4X36-16MB-70NS/60NS LOGIC	85
4X36-16MB-70NS/60NS MAJOR	105
8X36-32MB-70NS LOGIC	180
8X36-32MB-60NS LOGIC	180
8X36-32MB-70NS MAJOR	210
8X36-32MB-60NS MAJOR	230
16X36-64MB-70NS/60NS	210
1 X 32-4MB-70NS/60NS	25
2 X 32-8MB-70NS/60NS	45
4 X 32-16MB-70NS/60NS	85
8 X 32-32MB-70NS/60NS	185
16 X 32-64MB-70NS/60NS	400
EDO MEMORY	
4MB/8MB EDO	25/47
16MB/32MB EDO	85/165
PIPELINE CACHE	
256K/512K	25/[illegible]

HARD DRIVES

Seagate

FACTORY NEW 1-5 YEAR WARRANTY				INT EXT
ST3630A	631MB	14MS	IDE	CALL
ST3541A	540MB	14MS	IDE	CALL
ST31276A	1 27GB	12MS	IDE	189-349
ST31720AB	1 7GB	12MS	IDE	195-345
ST32132AB	2 1GB	10MS	IDE	219-369
ST52520AB	2 5GB	11MS	IDE	225-375
ST31055N	1 05GB	9MS	SCSI-2	395-420
ST32430N	2 1GB	9MS	SCSI-2	575-700
ST32550N	2 1GB	8MS	SCSI-2	669-794
ST32171N	2 1GB	8 5MS	U SCSI	548-673
ST34501N	4 5GB	7 5MS	SCSI-2	1049-1249
ST32560N	2 1GB	8MS	SCSI-2	669-794
ST34371N	4 3GB	8 5MS	U SCSI	835-960
ST410800N	9 0GB	11MS	SCSI-2	1600-1800
ST19171N	9 0GB	9MS	U SCSI	1689-1889
ST19101N	9 0GB	8MS	SCSI-2	3379-3579
ST423451N	23 2GB	13MS	SCSI-2	3809-4209
WIDE SCSI				**INT EXT**
ST31055W	1 05GB	9MS	SCSI-2	349-474
ST32155W	1 05GB	9MS	SCSI-2	497-623
ST32171W	2 1GB	8 5MS	U SCSI W	599-624
ST34371W	4 3GB	8 5MS	U SCSI W	899-1024
ST34501W	4 5GB	7 5MS	U SCSI W	1109-1309
ST410800W	9 0GB	11MS	SCSI 2	1899-2099
ST19171W	9 1GB	8MS	U SCSI W	1789-1989
ST19101W	9 1GB	8MS	U SCSI W	3589-3789
ST423451W	23 2GB	8 5MS	SCSI-2	3849-4149
SCA SINGLE CONNECTOR ATTACHMENT				**INT EXT**
ST32171WC	2 1GB	8MS	SCA	699-849
ST34371WC	4 3GB	8MS	SCA	999-1049
ST34501WC	4 5GB	7 5MS	SCA	1179-1049
ST19171WC	9 1GB	8MS	SCA	1859-1049
ST19101WC	9 1GB	8MS	SCA	3629-1049
FC-AL/FIBRE CHANNEL ARBITRATED LOOP				**INT EXT**
ST34572FC	4 5GB	8MS	SCA	CALL
ST34501FC	4 5GB	7 5MS	SCA	1299-1499
ST19171FC	9 1GB	8MS	SCA	2199-2399
ST19101FC	9 1GB	8MS	SCA	CALL

Quantum

ATLAS SCSI 2 SERIES-5 YEAR WAR.				INT-EXT
XP32150S	2 1GB	8MS	Fast SCSI-2	$599-724
XP32150W	2 1GB	8MS	Fast Wide SCSI	599-724
XP34300S	4 3GB	8MS	Fast SCSI-2	929-1054
XP34300W	4 3GB	8MS	Fast Wide SCSI	999-1124
IDE DRIVES-5 YEAR WAR.				**INT-EXT**
TM31280A	1 2GB	12MS	IDE	$185-315
FB32110A	2 1GB	10MS	IDE	225-375
TM32110A	2 1GB	10 5MS	IDE	220-370
FB2500A	2 5GB	15MS	IDE	215-365
TM32550A	2 5GB	10 5MS	IDE	245-395
FB33240A	3 2GB	10MS	IDE	305-455
TM33200A	3 2GB	10 5MS	IDE	273-423
TM33840A	3 8GB	10 5MS	IDE	308-458
FB34320A	4 3GB	10MS	IDE	369-519
BF4335A	4 3GB	14MS	IDE	258-409
FB36480A	6 4GB	10MS	IDE	535-685
FB6510A	6 5GB	14MS	IDE	376-528
SCSI DRIVES-5 YEAR WAR.				**INT-EXT**
TM31280S	1 2GB	12MS	SCSI	$269-394
TM32110S	2 1GB	10 5MS	SCSI	309-434
FB32160S	2 1GB	10MS	SCSI	339-464
FB33240S	3 2GB	10MS	SCSI	389-539
TM33200S	3 2GB	10 5MS	SCSI	389-539
FB34320S	4 3GB	10MS	SCSI	479-629
XP34550S	4 5GB	8MS	SCSI	879-1029
FB36480S	6 4GB	10MS	SCSI	CALL
XP39100S	9 1GB	8MS	SCSI	CALL

MICROPOLIS

FACTORY NEW-5 YEAR WARRANTY				INT EXT
SCSI DRIVES				
MC4221	2 05GB	8 5MS	SCSI-2	CALL
MC4421	2 1GB	9MS	SCSI-2	CALL
MC3243	4 3GB	8MS	SCSI-2	$879-1029
MC4345	4 5GB	7 9MS	SCSI-AV	879-1029
MC3391N	9 1GB	10MS	SCSI	1345-1545
MC1991	9 1GB	10MS	SCSI-2	1699-1964
SCSI-AV DRIVES				
MC4221AV	2 05GB	8 5MS	SCSI-AV	CALL
MC3243AV	4 3GB	8MS	SCSI-AV	899-1124
MC4345AV	4 5GB	7 9MS	SCSI-AV	909-1034
MC3391AV	9 1GB	10MS	SCSI-AV	1455-1580
WIDE SCSI DRIVES				
MC3243W	4 3GB	8 5MS	SCSI	879-1004
MC4345W	4 5GB	7 9MS	SCSI	925-1075
MC3391W	9 1GB	8 5MS	SCSI	1455-1580
WIDE SCSI-AV DRIVES				
MC3243WAV	4 3GB	8 5MS	SCSI-AV	889-914
MC4345WAV	4 5GB	7 9MS	SCSI-AV	959-1084
MC3391WAV	9 1GB	8 5MS	SCSI-AV	1599-1799

FUJITSU

FACTORY NEW-5 YEAR WARRANTY				INT EXT
M1636T	1 2GB	10MS	IDE	$179-329
M1623T	1 7GB	10MS	IDE	188-331
M1624T	2 1GB	9MS	IDE	217-378
M1638T	2 5GB	9MS	IDE	219-389
M2954S	4 4GB	8MS	SCSI	729-849
M2954W	4 4GB	8MS	WIDE	749-874
M2949S	9 1GB	8MS	SCSI	1269-1489
M2949W	9 1GB	8MS	WIDE	1569-1789

Maxtor

FACTORY NEW-2 YEAR WARRANTY				INT EXT
M81750A	1 6GB	12MS	IDE	$209-359
M82187A	2 1GB	12MS	IDE	239-389
M82560A	2 5GB	12MS	IDE	257-402
M83500A	3 6GB	12MS	IDE	329-479
M5120A	5 1GB	10MS	IDE	405-555

WESTERN DIGITAL

FACTORY NEW-3 YEAR WARRANTY				INT EXT
WDAC21200	1 2GB	10MS	IDE	$195-345
WDAC21600	1 6GB	12MS	IDE	199-349
WDAC22100	2 1GB	12MS	IDE	219-369
WDAC32500	2 5GB	12MS	IDE	235-385
WDAC33100	3 1GB	12MS	IDE	269-419
WDAC34000	4 0GB	12MS	IDE	345-495
WD2170WB	2 1GB	8MS	SCSIW	599-624
WD4360SB	4 3GB	8MS	SCSI	999-1024
WD4360WB	4 3GB	8MS	SCSIW	1029-1154

NOTEBOOK DRIVES

TOSHIBA

NOTEBOOK DRIVES/1 YEAR WARRANTY ON 2.5"				
MK1002	1 0GB	13MS	IDE	$250
MK1301	1 3GB	13MS	IDE	275
MK1302	1 3GB	13MS	IDE	275
MK1901	1 9GB	13MS	IDE	295
MK1702	1 7GB	13MS	IDE	345
MK2101	2 1GB	13MS	IDE	450
MK2103	2 1GB	13MS	IDE	450
MK0000	3 0GB	13MS	IDE	850

IBM

IBM THINKPAD 700 & 750 SERIES				
QED/TP756-2100	2 1GB	13MS	IDE	$1290
QED/TP756-21CD	2 1GB	13MS	IDE	1235
QED/TP756-1440	1 4GB	13MS	IDE	850
QED/TP756-1080	1 0GB	13MS	IDE	755
IBM THINKPAD 760C,CD,E,ED,EL,ELD,L,LD				
QED/TP760-2100	2 1GB	13MS	IDE	1290
QED/TP760-21CD	2 1GB	13MS	IDE	1235
QED/TP760-1440	1 4GB	13MS	IDE	850
QED/TP760-1080	1 0GB	13MS	IDE	755
QED/ULTRA-DRV	2nd HDD Ultra Bay Adapt			75
IBM THINKPAD 355, 360, 750, 755				
QED/TP750-2100	2 1GB	13MS	IDE	1200
QED/TP750-1440e	1 4GB	13MS	IDE	850
QED/TP750-1080	1 1GB	13MS	IDE	700
IBM THINKPAD 701 C/CS (Butterfly)				
QED/TP701-2100	2 1GB	13MS	IDE	1255
QED/TP701-1440e	1 4GB	13MS	IDE	810
QED/TP701-1080	1 1GB	13MS	IDE	655

NEC

VERSA P, M, V, E, VersaBay II				
QED/VERSA-2100	2 1GB	13MS	IDE	$1215
QED/VERSA-1440	1 0GB	13MS	IDE	810
QED/VERSA-1080	1 0GB	13MS	IDE	700
VERSA 6000, 4000 & 2000 SERIES				
QED/V246-2100	2 1GB	13MS	IDE	1215
QED/V246-1440	1 0GB	13MS	IDE	810
QED/V246-1080	1 0GB	13MS	IDE	700

COMPAQ

COMPAQ LTE ELITE				
QED/ELITE-1200	1 2GB	13MS	IDE	$810
COMPAQ LTE 5000				
QED/LTE5X-2100	2 1GB	13MS	IDE	1215
QED/V246-1440	1 4GB	13MS	IDE	810

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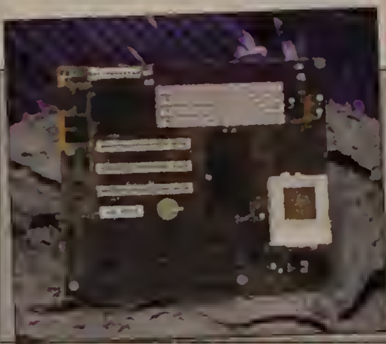

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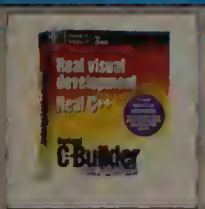
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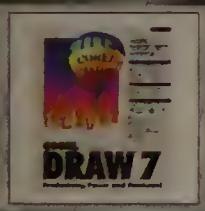
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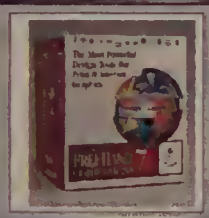
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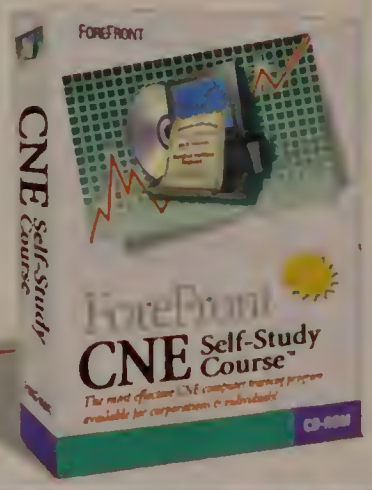

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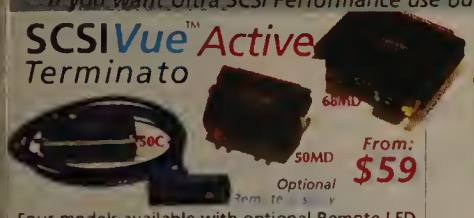

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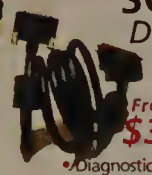

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- Fixes Ultra SCSI Cable Problems

Features:
- Perfect 90 Ohm Impedance Match
- Triple Pronged Connector With Gold contacts

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Benefits:
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Features:
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- Test Cable Integrity
- No Loss Of Important Data

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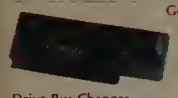
Gold Diagnostic Adapters

Styles: Gender Changers
- Both 50 pin and 68 pin (all combinations)

Gender Changer



Drive Bus Changer
Irun 68 pin on 50 pin bus

Styles: 68 pin Drive to 50 Bus
- 68 Pin Drive to 50 Pin IDC (runs wide drive as narrow)

Styles: 68 Pin Adapter Wide to 50 Pin Narrow
- 68 Pin External Adapter to 50 Pin (converts Host Adapter)

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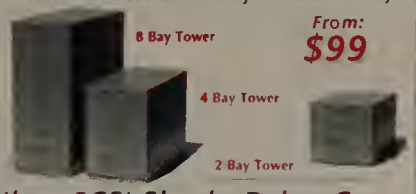

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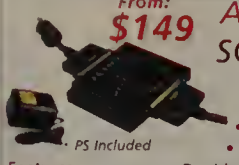

PS Included

Benefits:
- Models for all SCSI types
- Fixes SCSI Cable Problems
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Features:
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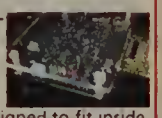
- Ultra Fast Performance for Added Capabilities
- Diagnostic Capabilities • 30u" Gold Contacts

OEM SCSI Repeater



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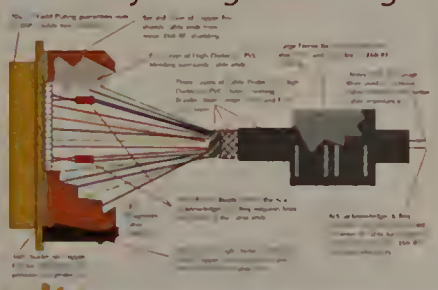

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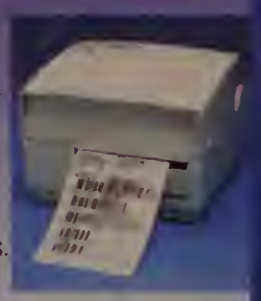

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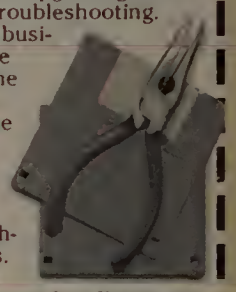

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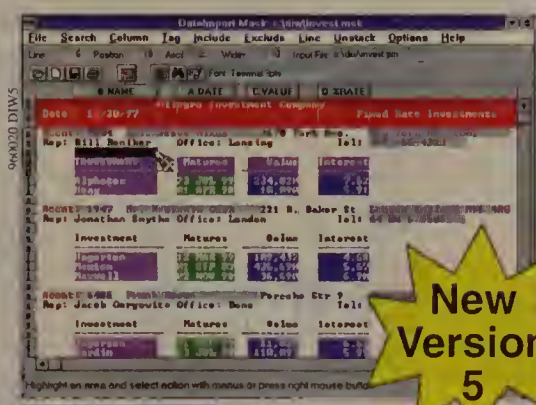

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952 Notebook computers
953 Windows 95 software
954 Monitors and video boards
955 Accounting software
956 Graphics software
957 Network/sharing products
958 Printers
959 Multimedia products
960 Utilities
961 Mail order companies
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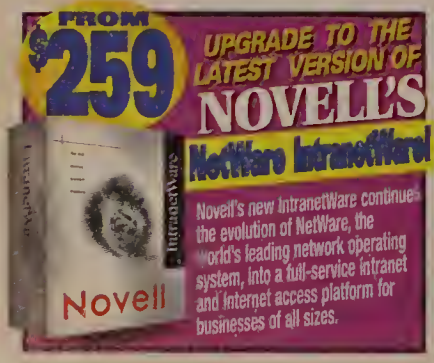

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What Your Next PC Will Look Like

ONE OF THE WONDERFUL THINGS about computers is how quickly the barn burner you bought last week becomes a bucket of decaying silicon. Thanks to PC 98, the standards-setting initiative from Microsoft and Intel (with help from Compaq), next year's computers will differ significantly from what you're using now. In other words, PCs will become simpler, faster, and more flexible.

That's the official story, anyway. The idea is to make you believe you need a new PC. Think you've just bought a hot machine? Consider this: Before a system can receive a "Designed for Windows" logo next year, it will need a 200-MHz Pentium MMX processor and 32MB of RAM—and that's the *minimum* requirement.

The goal of **PC 98** is a computer that acts like a **consumer electronics** unit (or, dare we say, a **Macintosh**).

SUCK UP THOSE CYCLES

SO YOU MAY WELL NEED a new machine, particularly if you plan to do anything with that incredible cycle-sucker, digital video. With real-time data streams traveling in and out of our PCs, speedier ways of handling data are crucial.

For openers, say good-bye to slow, clunky ISA slots. They've been a fixture ever since the IBM PC AT, but after PC 98, ISA slots will stick around only to service legacy devices like parallel ports, keyboards, and floppy drives. Otherwise, like 5¼-inch floppies and VESA cards, ISA slots will take up residence in the Home for the Outmoded.

That's not the only big change. The Universal Serial Bus built into many new PCs is fast enough for most purposes, but it doesn't cut the mustard with high-speed data sources like hard drives or digital video cameras. For that, the much faster IEEE 1394 bus (aka Firewire) will be PC 98's standard-bearer.

PCI will remain, but another new motherboard bus, the Accelerated Graphics Port, will become a graphics standard. Sound cards will move to PCI or disappear entirely, replaced by digital signals that travel up the USB wires and get decoded inside the speakers. A developing standard called Device Bay should let you plug and unplug components, so you can, say, swap drives between your laptop and desktop.

The goal is a PC that acts like a consumer electronics unit (or, dare we say, a Macintosh). Most add-ons will attach from the outside, thanks to the daisy-chainable USB and 1394 buses. Eventually, standard devices will be replaced by ones that work with the new buses.

ALMOST A MAC?

SURE, THE PC 98 INITIATIVE is self-serving for Intel and partners, who want to sell more of their stuff. It's also about time. The PC has never come close to matching the Mac's ease of hooking up peripherals. Connecting SCSI devices has been a chronic pain. The number of parallel devices competing for a PC's single port has become a sick joke. And if I never deal with another IRQ conflict, that's soon enough for me. But this means peripherals makers must stop using ISA cards; unfortunately, even companies as savvy as Hewlett-Packard still do.

With a theoretically more stable platform, Windows itself should work more seamlessly. It had better. The entire initiative depends on support from the upcoming Memphis and NT 5.0 versions of Windows, but getting hardware, software, and peripherals in sync isn't easy. Last year, machines with USB ports arrived before Windows or peripherals supported them. This year, hardware for the new ACPI power management standard, which lets Windows make your PC instantly wake up and do tricks, will almost certainly be ready before the new operating systems that make it work.

Although the standard setters are trying to ensure that legacy programs will still work, I'd be flabbergasted if many DOS games don't encounter problems. I'll gladly pay that price for systems that are truly silent when they're "sleeping" and quiet when they're awake. But if I'd just bought a new scanner that came with an ISA interface card, I'd be plenty unhappy.

As I write, the standards are still being developed (they're available at developer.intel.com/design/pc98/). There may yet be time to cast your vote to save the ISA slots, but do me a favor: Don't.

PC World *contributing editor Stephen Manes is a columnist for the* New York Times *and coauthor of* Gates: How Microsoft's Mogul Reinvented an Industry *(Touchstone/Simon & Schuster, 1994, 800/223-2348).* ■

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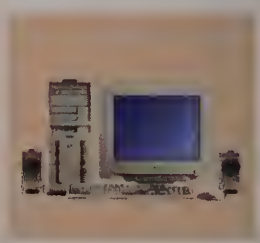

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